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INDEX TO ADVERTISERS; SEE PAGE 16 FOR BUYERS' GUIDE.

For other Professional Cards, see page XII.

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TABLE OF CONTENTS.

The Elections and Mining.

We believe it was the distinguished actor Joseph Jefferson who sapiently remarked concerning presidential elections, "In my judgment the country would be just about where it is to-day if the other fellow had been elected every time." Probably the ever delightful Rip meant his remark merely as a piece of merry absurdity, but it might have been made with some seriousness so far as the mining industry is concerned. Perhaps no other calling in which men engage depends so little for its prosperity on purely political conditions. The precious and the useful metals command their own market at all times and in all countries. They are universally negotiable, and are better than United States bonds or English Consols.

While, therefore, no government is too good for the mineral industries, and while they prosper most under stable, honest, and progressive rule, yet they prosper anyway if only Mother Earth so wills. Dame Nature has vastly more to do with it than all the Bosses that ever made a jest of republican forms of government.

Cheap Transportation of Coal.

The Chesapeake & Ohio Railway has continually astonished railroad men by its ability to haul coal at pitifully small rates. The explanation is to be found in the fact that the coal is carried in enormous train-loads for a long distance, with the general direction downward. Railroad managers thought it a great achievement when the Chesapeake & Ohio was able to show, in 1898-99, an average train-load of 425 tons; but the report just issued for the last fiscal year (1899-1900) betters this record, disclosing the extraordinary figure of 488 tons.

This efficiency of management explains the cheap rates that have long characterized the coal traffic of this company. In the year just reported the average rate for the entire coal tonnage of the road was only 2.02 mills per ton mile—one-fifth of a cent per ton per mile. In other words, the road was obliged to move five tons of coal one mile in order to earn a single cent.

This is undoubtedly the lowest rate received by any railroad in the world for the transportation of any commodity, and only a few years ago the rate would have been deemed inconsistent with solvency. Under the conditions noted, however, the Chesapeake & Ohio can make money by hauling coal on this basis. Its coal and coke traffic last year amounted to 4.68 million tons—nearly half its entire freight traffic.

The Anthracite Strike.

Monday, September 17, was the day set for the great strike of anthracite coal miners, and about 90,000 men obeyed the order of their union. Since then considerable accessions have been made to their ranks, and now it is thought that not far from 120,000 men, or four-fifths of the entire number engaged in anthracite mining in Pennsylvania, are on strike.

A good deal might be said on both sides of the various questions involved, since neither party to the controversy appears to have all the right and justice on its side. The more regrettable is it, therefore, that some way out of the trouble was not found consistent with the essential rights of both parties. It seems clear that a large body among the miners were opposed to the strike at heart, and might have been won over to the side of the operators and possibly have controlled the movement of the entire army of employees if slight concessions had been made. On the other hand, the operators have good cause to remember their experience with unions in the past, and they undoubtedly thought it good business judgment to abstain utterly from any sort of recognition of the organization known as the United Mine Workers.

The strike is not receiving so much attention as its possible importance warrants, and the general impression has been that it will not long continue. Another week or two will probably determine the result, and if the strike leaders do not succeed within that time in stopping or at least checking the operations of the 20,000 miners still at work, they will hardly be able to hold back the large number of men now among the strikers who are anxious to go to work. The latest news of the week, however, is less encouraging from the point of view of the operators. Threats of violence are heard, and signs appear that a long and bitter struggle may develop.

The Price of Steel Rails.

Railroad managers in particular and steel and iron men in general have taken deep interest in the conference of manufacturers recently held in New York City to determine the price of steel rails for 1901. Although steel and iron values have been falling for several months, and have been at times in most departments more or less demoralized, the price of steel rails has been held rigidly at $35 a ton. Even the most important and otherwise favored buyers have been unable to obtain concessions. The profits to rail makers have undoubtedly been prodigious, as they have bought their raw material on a declining market, but have made no corresponding reduction in the price of the finished product.

The story is interesting, and has the further merit of promising piquant chapters in the future. During 1897-'98 and even early last year, steel rails were bought and sold in an open market, and the price broke to $18 a ton. The manufacturers then formed one of the strongest and most successful organizations of the kind ever effected. From $18 the price advanced to $35, where it stood in November, 1899, and from which it has not moved since. The ability of the manufacturers to obtain and hold this 100 per cent advance is largely explained by the increased traffic and unexampled prosperity of the railroads, which both enabled and forced them to buy large quantities of steel rails.

This demand has filled the mills with orders, which even now run some months ahead, but it has long been evident that this abnormal price of $35 could not continue. The decision reached at the conference September 21 was to make the price for next year $26. This reduction, though one of nearly twenty-five per cent, will be regarded by the railroads as insufficient, since steel billets are readily obtainable at $17 a ton, and under normal conditions the quotations of billets and of rails are only a dollar or two apart. It seems probable, nevertheless, that this new price will stand for some months at least, since the need of the railroads has become urgent. Because of the high price they have bought as sparingly as possible for months, and it is estimated that they now have orders all ready to be placed amounting to sixty or seventy million dollars. The settlement of the matter and the closing of these contracts will have a marked and beneficial effect upon the general iron and steel situation.

Pan-American Exposition.

The United States Geological Survey has been asked to organize the Mining Department of the Pan-American Exposition, and has directed David T. Day to take charge of the work. Mr. Day is now in Paris attending the exposition there, and it is understood that he will so far as possible preserve intact for the Pan-American Exposition the magnificent exhibit of the United States at Paris.

Metal Mining in China.

Mining, Like Everything Else There, Very Much Behind the Times—Gold and Silver—Lead in Shantung and Chi-li Provinces—The Geology of the Mineral Regions.

Not because China now appears attractive as a field for mining enterprises or other enterprises usually conducted in civilized nations, but because the present grave crisis there may finally result in conditions favorable to the introduction of modern ideas, a paper recently prepared by Herbert C. Hoover for the Institution of Mining and Metallurgy of London on "Metal Mining in China," is especially timely. The provinces of Chi-li and Shantung, of which Mr. Hoover writes, are in the northern sections of China. He says:

Metal mining in these provinces and in China in general is an exceedingly old industry, the small output and apparent insignificance of which has not been, as is popularly supposed, so much due to superstition and Imperial disapproval, as to the inability of the Chinese to make any considerable profit by the methods of which the people have knowledge. Owing to a lack of pumping machinery the strict limitation of mining up to the last few years has been water level, and to that depth the principal mines have been long since worked out. The spasmodic nature of enterprises of such limited career, and often illegal character, has furnished no field for the growth of an industry. Then the individual character and apparent inability of the Chinese to work co-operative enterprises not of immediate returns, unless under Government control, also militated against any development system, even when it could have been accompished by tunnels for drainage.

In Chi-li the mountains are dotted with dumps of former workings, of which the inhabitants have no memory, and universally attribute to the Coreans. A bedrock tunnel, 3,000 feet long, driven to drain some deep alluvial at Ching Ch'ang Kou Liang, in Chi-li, was discovered in reopening the mines some twenty-seven years ago, and some pottery unearthed at that time was said to be Corean.

Through the progressive policy of Viceroy Li Hung Chang, metal mining was started on Western methods and under European engineers. In 1883 copper mines were opened near Pa Kou, in Chi-li; in 1884 gold mines at Ping Tu, in Shantung; and in 1888 silver-lead mines at Ku Shan Tzu, in Chi-li. Unfortunately all these ventures failed lamentably, and metal mining received a severe set-back. Most of these mines continued working, however, partially by Chinese methods, after the foreigners had left; and the Chinese, profiting by the lessons received, have opened mines at several localities, using a curious mixture of foreign and native methods, but without much profit—to the owners, at least. The product of gold from the mines of Chi-li, running under official cognizance, was near 50,000 ozs. in 1898, and about 6,000 ozs. in Shantung during the same period. The product of silver from legalized mines in Chi-li was near 140,000 ozs. in 1898.

GEOLOGY OF THE MINERAL REGIONS.

The mountain systems of the two provinces present a complex of older igneous and metamorphosed rocks, flanked and overlaid by interfolded sediments of a much later period—the latter at least partially carboniferous—the whole traversed by later volcanics, offering a maze of structural problems not to be solved by reconnoissance surveys. Pompelly and Richtofen have endeavored to reduce the series to some system, but anything other than exhaustive surveys will always be unsatisfactory. For purposes of this paper we may adopt a very general classification based on Richtofen—(1) Basal rocks of the ranges, (2) interfolded but unmetamorphosed sediments, (3) volcanics and loess. (1) This class would embrace Richtofen's Archaen and Cambrian (Sinian) systems and consists of granites, gneisses, diorites, diabases, enormous thicknesses of metamorphosed limestones, schists, and quartzites. So far as observed by the author and assistants the metalliferous deposits are entirely confined to this series, and their geographical distribution marks the limit of metal possibilities. (2) This series consists of old unmetamorphosed sediments of a great thickness of conglomerate, sandstones, limestones, and slates folded to a remarkable degree, embracing Richtofen's carboniferous and jurassic. These rocks are largely carboniferous, and coal has a wide distribution through them. Erosion has been so severe as to leave them in remnants, usually forming the foothills. (3) Local areas of recent volcanic basalt, andesite, and rhyolite occur over the two provinces, and still later deposits of loess are widely distributed. These two formations bear no relation to the mineral possibilities, other than by burying the older series they extinguish a portion of the possible area.

In Chi-li the latest event of structural history is of great economic bearing, and warrants some discussion. The stream beds and canyons are all "filled" with gravel, presenting narrow alluvial valleys. It seems that at no distant period there has been a general subsidence of at least the northeastern portion of the province; and the stream gradients, formerly sufficient to give the velocity necessary to erode their beds, so decreased as to cause the canyons to fill considerably. This varies from nothing at head waters to as much as 300 feet in lower reaches of the larger streams. The Chinese alluvial miners are unable to go more than fifteen or twenty feet deep in the beds of streams, and it is reasonable to suppose that in the neighborhood of veins the bedrock may be very payable.

THE OCCURRENCE OF GOLD.

Gold occurs at innumerable places throughout the whole of the mountainous portions of Chi-li, but only in a few isolated districts of Shantung. Some fifty districts were visited by the author and assistants, and the deposits were found as (1) quartz veins, (2) possibly impregnations of limestone, (3) alluvial.

The gold quartz veins occur impartially through the older rocks, including the metamorphic limestone. There is no general direction or strike over the region, although individual districts were more or less parallel. Superficial decomposition is universally shallow, extending more often less than twenty feet than over 100 feet. There are two general classes of these veins— (a) normal fissure quartz veins, (b) gash veins. The fissure veins are of two quite distinct types. First: Narrow veins, which are composed of ore bluish ribboned structure, showing a large proportion of lead sulphides, and usually of high grade. Second: Wide veins of low grade milky white quartz showing almost exclusively iron sulphides, usually in large masses. Of the former the main reef at Ching Ch'ang Kou Liang, lying forty miles northwest of Chow Yang, in Chi-li, is a good example. Here the vein varies from twelve to twenty-four inches wide, continuing between well-defined walls, and has been driven upon continuously for over 4,000 feet in length, and is nowhere completely extinguished. It shows two ore chutes aggregating over 1,000 feet long; the one is a bluish ribboned quartz, about sixty per cent free milling, and contains about ten per cent sulphides of lead, iron, copper, and zinc. It has yielded by native methods, aided by foreign pumps, 43,000 ozs. of gold from 39,000 tons in the last six years. So far as observed all the deposits in Shantung are of the second type, and they also occur north of the Great Wall, but not of the same extreme size as in Shantung. The Chow Yuen mines in Shantung are a good example; here the vein crops out boldly for over a mile from thirty feet to ninety feet in width. The ore occurs in undetermined chutes through the huge mass of quartz, which everywhere contains great veins of iron pyrites. The ore is about forty per cent free milling, shows fifteen to twenty per cent of pyrites, and the general average of ore is of low grade.

Gash Veins.—These veins, so common in all quartz districts of Chi-li, would warrant but little discussion were it not that the peculiar economic conditions of labor, and the fact that the wider veins were all worked out to water level by the "ancients," renders these a source of considerable output, though hopeless of profit by modern methods. These veins average three inches to six inches in width, and are exceedingly erratic, the ore occurring in uncertain lenticular seams. Such veins often occur isolated and at great distances from other deposits; at other times they occur in great numbers, forming a perfect network. Such occurrence was described by Ellis Clark at Je Swie as a stockwerke, but careful examination fails to either corroborate this or the assays given of the ore values. Fully 8,000 men are employed on such deposits at present.

Impregnations.—Owing to the lack of development and consequent uncertainty of possibilities of superficial enrichment, but little can be said definitely of this class of deposit. Where the limestones form the country rock, as is occasionally the case in Chi-li the rock itself in some instances yielded considerable gold.

Alluvial.—The streams through the mountains of Chi-li all contain some gold, and often do so in Shantung. Such deposits through the mountain ranges have been the main sources of China's gold product for centuries, and even at the present time are constantly being washed in the neighborhood of the richer quartz districts wherever the natives can earn a few copper cash per day. As previously noted, the structural changes of the range have made these deposits secondary, while the primary deposits—the gold on the bottom bedrock—except in one instance within this region, have probably never been touched.

The filled canyons or valleys are always the course of a considerable stream, and any attempts of the Chinese to reach the real bedrock, which they reasonably conceive to be very rich, have been foiled by lack of means to overcome the water. The tunnel at Ching Ch'ang Kou Liang drains such a buried basin and stream bed for about three-quarters of a mile, and has yielded enormous returns of gold. Here the bedrock is covered by eighty feet to 100 feet of gravel and sand, containing a small amount of gold from the top down, but particularly concentrated on the bedrock.

THE SILVER-LEAD DEPOSITS.

No silver deposits of any consequence have been found in Shangtung, but some mines have been worked to a considerable extent in Chi-li, particularly near Je Hol. The principal mines have been worked by foreign methods, and consist of a series of quartz veins in limestone. These veins carry throughout well distributed argentiferous galena in small quantities, but more particularly lenticular masses or seams up to one foot wide and 100 feet to 200 feet long of almost solid galena, yielding up to 500 ozs. to the ton. Silver occurs native as sulphide, chloride, and as ruby silver, and is associated with sulphides of lead, zinc, arsenic, and antimony. There is no gold traceable. The rich ore bodies are very erratic, and failure resulted from the installation of foreign methods, although the natives, by continuing the use of pumps, are working 850 feet deep at Ku Shan Tzu. Other small silver-lead veins were observed associated with feldsite dykes, but were also very narrow.

Copper has been worked in Chi-li, near Pa Kou, by foreign methods, but neither these nor other reported deposits have been visited by the author.

NATIVE METHODS OF MINING.

As evidence that mining has long been current in China, may be cited the perfection to which they have developed their own metallurgy. Gold ore is underhand stoped from the surface, broken by hand to the size of a nut, dried, and partially roasted over a fire, then milled dry in mills somewhat similar to a Chili mill. These mills consist of a circular stone, about five feet in diameter, upon which the ore is ground dry by a roller, about eighteen inches by twenty-four inches, propelled by a mule. These mills grind from one-third to half-a-ton per day, and possess many advantages over a Mexican arrastra. The dry ore is washed over a gently sloping board, the heavier particles being constantly concentrated by brushing them up the slope. These concentrates are then panned off in a wooden dish, and the gold separated. The remaining concentrate is sometimes roasted, and always allowed to oxidize in the open air, and subjected to repeated washings. The ultimate extraction is about eigthy per cent. The native mining companies buy this gold from licensed miners for a price leaving a good margin, and where pumping is done, or water-power mills furnished, the company makes further reductions in the price per ounce.

Silver ore is broken to small size, sometimes concentrated by similar methods to gold ore. The ore is then roasted, or rather agglomerated, in round, open, mud furnaces; the resulting mass being reduced in beehive like furnaces, with a blast from a native bellows. These furnaces are in principle, and in many details, the same as the Western jacket furnace, but only two and a half feet high and eighteen inches in diameter. The charge is made up of about 250 pounds of roasted ore, 100 pounds of slag, from previous operations, and 75 pounds of litharge from cupellation. The lead and slag are drawn off separately, and the lead bars then cupelled upon a pile of molded wood ash with a muffled covering of mud-brick. The muffle is covered with charcoal, and this in turn plastered over with mud. The charcoal is fired and more lead added through a hole in the top, until the absorption of the wood ash is exhausted. The resulting silver has a remarkable fineness.

ECONOMIC CONDITIONS.

The fact that an unlimited amount of able-bodied labor can be obtained in China for 6d. per

day is often estimated in too favorable a light. To work in the sense of Western miners is an unheard-of exaction, and even where these men have been employed under foriegn direction for a number of years the ratio of effectiveness is about five to one. However, even at this rate mining should be very cheap. The men are docile and easily handled, and their tendencies to dishonesty are probably no greater than other human beings under the same conditions. Throughout the two provinces coal is available from distances not exceeding thirty miles, and with improved methods of mining, construction of roads, etc., should not cost more than 8s. per ton at the mine. Water is abundant everywhere, and at many points water-power can be secured. All tools, dynamite, etc., must be imported from foreign counrties, and the almost impassable roads would make transportation enormous were it not for the cheapness of labor. Although no experience of systematic working can be adduced, it is probable that working costs of gold mining under foreign administration should not exceed 20s., even on narrow veins, and large deposits could be made to compete with any in the world for minimum costs.

California Hydraulic Mining.

The Caminetti Act—Its Effect on the Hydraulic Mining Interests of the State—Methods of Working the Placer Deposits.

The gold deposits of California are, for a large part, contained in gravel beds once the channel of rivers which formed the drainage of the west slope of the Sierra Nevada Mountains. In the course of ages new rivers were formed, leaving the ancient gravel beds elevated often hundreds of feet above the river beds of the present. The Scientific American says that the depth of the gravel in the old channels is often several hundred feet and the width across them frequently one-half mile, while their courses may be traced for thirty or forty miles in length in detached sections which are the remnants of once continuous beds. Denudation and the cutting down of the present streams has removed parts of the ancient channels and they often disappear below the surface for several miles underneath coverings of lava which have been spread over them.

The gold occurs distributed more or less irregularly, and varies in size from microscopic particles to nuggets several ounces in weight. It often occurs concentrated in rich layers near the bottom of the beds, and when this is the case, especially where there is a covering of lava too thick to make its removal profitable, tunnels are run along the bed rock and side workings extended from these, only a layer a few feet thick of the richer gravel being removed, the upper mass being left in position. This method is known as drift mining. There are often acres of ground honeycombed in this manner, supported upon timbers and upon pillars of the gravel which it would be unsafe to remove. Gravel yielding one dollar per ton and upward may be mined in this manner.

Where the gravel extends to the surface, the whole depth of the deposit is removed and the method followed is that termed hydraulic mining. A vertical bank is first exposed and a large flow of water carried in an iron pipe under heavy pressure is discharged through nozzles in jets directed against the base of the gravel bank and used to undermine it. The gravel and the water are afterward carried off in wooden flumes frequently a mile in length, in passing through which the gravels are broken up and washed, the gold lodging in interstices in the paving of the flumes, or, when small in size, is caught by particles of quicksilver distributed along the flume to catch it. The use of water in this matter was a gradual development. It was first used upon a small scale shortly prior to 1860. The first nozzles were but slightly larger than garden hose jets, but in course of time were increased in size until jets eight and nine inches in diameter were used. When operations are upon a large scale, gravel deposits yielding five cents per cubic yard, and less, have been mined profitably by this method.

HYDRAULIC MINING AN IMMENSE INDUSTRY.

Hydraulic mining became an immense industry. At the time when it had reached its greatest development it was estimated that more than one hundred millions of dollars had been invested in the construction of water supplies, mining plant, tunnels, and flumes, and more than two million dollars have been spent in the equipment of a single mine. Everything was upon an immense scale, and the amounts of gravel removed were in proportion. So large, in fact, that the material washed into the streams caused blockages, overspreading agricultural lands in the Sacramento Valley, obstructing and raising the beds of the navigable rivers which entered San Francisco bay, causing inundations at times of flood, and generally making its influence noticeable 200 miles from the seat of mining. In 1880 it was estimated that in the bed of the Yuba River alone there were stored more than one hundred and forty million cubic yards of accumulations, and the bed of the river had spread over a width of two and one-half miles between the side levees built to confine the spread of the deposits. Upon the other hand, of the estimated yield of about $614,000,000 of gold mined in California between 1858 and 1881, a very large share had been extracted by hydraulic mining.

In consequence of the damage caused by the industry, suits followed to enjoin the mines. During 1880-1881, dams were constructed under direction of the State government to store detritus in the Yuba and Bear rivers, but the work being only partially effectual, was soon discontinued. Years of litigation ensued, alternated with efforts to secure the aid of the Federal Government through its interest in preserving navigation on the rivers. The industry gradually waned in importance, owing to the legal obstacles placed in the way of working the mines and partly owing to lack of inducement for capital to seek investment in new enterprises or to adequately keep up the works in use. The output from the hydraulic mines in 1892 was perhaps less than ten per cent. of the estimated output ten years earlier.

Finally an act was passed by Congress and approved March 1, 1893, known as the Caminetti Act. This act provided for the appointment of a commission to consist of three officers of the Corps of Engineers, United States Army. It made unauthorized hydraulic mining punishable by fine and imprisonment, and the duties of the Commission, briefly stated, are: "First, the prevention of such hydraulic mining as may be deemed injurious to the navigable waters within the Commission's jurisdiction, permitting, under proper regulation, such mining in cases where it can be carried on without such injury; second, to mature general plans for the improvement of the rivers whose navigability has been injured by hydraulic mining, and, if practicable, to devise general methods whereby such mining may be carried on without damage to the navigable waters."

The present members of the Commission are Colonel S. M. Mansfield, President; Lieut-Col. W. H. Heuer and Captain Herbert Deakyne, Secretary, all members of the Corps of Engineers, United States Army.

THE CAMINETTI ACT.

The Caminetti Act has been in force since 1893, and under its provisions 468 mines have applied for authority to operate and 360 mines have been granted permits to use the hydraulic process, but not all of these are in operation. Many of the licensed mines are small ones, the large proportion of which is explainable owing to the relatively greater ease with which storage sites are procurable for the small mines and also the smaller outlay required to equip them. The exceptionally severe winter of 1891 and 1892, and the effect of the very deep snow, caused the wrecking of miles of flumes and seriously impaired the efficiency of almost every water supply belonging to the larger mines, all of which draw their water from sources located at high altitudes in the Sierras. The uncertain status of hydraulic mining and the large outlay necessary to repair these water supplies has contributed in a large measure to their disuse or only partial repair, and, in fact, did more to check hydraulic mining than litigation or any other cause. The smaller mines were not affected in like degree.

The reports of the California Debris Commission show an estimate of 5,722,783 cubic yards of material moved by licensed mines between October, 1893, and July 1, 1899. The largest hydraulic mine, the North Bloomfield, has never been under control of the Commission, and its product is not included in the above estimate. It has impounding works, where debris is stored, and its output of gravel is believed to have approximated one million yards per annum since the impounding of its detritus began. In the years when the mine operated without any restriction, its output was undoubtedly much in excess of this figure.

The material impounded has been stored by dams built across the beds of streams, and in many cases by causing its deposit upon flat areas adjacent to the streams and in the worked-out pits of abandoned mines. The latter localities have always been preferred by the Commission, as the deposited material is permanently arrested in them, whereas material stored in the streams is subject to being partly removed should a dam break or rot away. In no instance has a dam been authorized in any stream draining a large watershed, and wherever practicable they have been supplemented by wasteways cut in rock to carry flood water around the dams instead of over them.

MOORE'S FLAT DAM, BUILT OF LOGS AND BOARDS.

The relatively small values contained in hydraulic mining gravel make it necessary, for profitable working, that the cost of storage shall not be large. For this reason the dams, so far as yet built, are inexpensive structures, and are planned to utilize material handy to the work, principally brush, logs and rock.

BUILDING THE DAMS.

For use in water courses there are two principal types of work, brushwork and log cribbing. The brushwork consists of brush usually about eight or ten feet long, placed in layers with the butts even and down stream, each layer separated by large poles or small logs laid lengthwise with the dam about one and a half feet from the butts of the brush. All the large limbs are lopped off so that the brush will lie compactly, and the dam is so built that when completed the butts are about two feet higher than the tops, so that the latter are well imbedded in the mud before the dam is full. Work of this character is substantial and lasting, and when properly weighted and bound with wires will allow a large flow of water to pass over it without damage. It derives its support principally from the weight of the material lodged above the brush and in its interstices, the poles, which vary from five to twelve inches in diameter, serving mainly as spreaders to make up the difference between the thickness of the butts and that of the bushy ends of the brush, thus preserving the proper inclination of the latter to make regular work. The principal limitation to the use of this character of work is the fact that no considerable height

can be laid up at one time without making it springy and deficient in compactness. Usually five or six feet of work is laid first and mine material allowed to accumulate till it covers the tops of the top layer of brush, and the dam is afterward added to, layer by layer, as accumulations collect in the basin, keeping the crest always about the same height above the level of the mud. When used in water courses the total height for this kind of work is ordinarily not permitted to exceed twenty feet in one structure.

The log crib structures consist of an upstream and a down-stream wall of logs, varying from fourteen inches to three feet or more in thickness, usually not less than fifteen feet apart, connected by cross logs, the walls of the cross logs being spaced more than sixteen feet apart, all logs being well notched at crossings and drift-bolted at each crossing. The lower course is usually bolted strongly to bed rock. The up-stream wall is vertical and the down-stream wall is given a slight slant up-stream, and the end logs of both walls are firmly joined into the sides of this creek. The cross logs are inclined slightly so that their down stream ends are two to three feet higher than the up-stream ends. The log framework of such dams is commonly given a height of twelve to twenty feet and inspected before mining is allowed to begin. Their lower parts are filled with rock and gravel to weigh them, the height of filling prescribed varying with the degree of flood exposure and according to the total height to be finally given the structure. About forty feet is commonly fixed as a limit of height for such dams, but plans for dams sixty and even eighty feet in height have been approved, the base being then correspondingly increased to twenty-four or thirty feet, and a complete filling with rock is made a requirement.

There are numerous combinations and modifications of these two styles of work in use.

THE DEBRIS DAM.

An interesting type of debris dam consists of an up-stream face and a down-stream face of sloping brush work, gravel or broken rock being sluiced in as a filling between the brush walls to form the body of the dam. The base is made sufficiently wide to permit the walls to be drawn in upon slopes of forty-five degrees or steeper, allowing for a crest width of about fourteen feet on top. During construction the work is protected by a shaft built with large, well-framed log sides communicating with a tunnel in bed rock, which passes under the dam, the sectional dimensions being sufficiently large to carry any flood likely to occur, thus providing that floods shall pass out under the dam and not pass over it. The shaft is built up gradually, and its top kept several feet below the level of the work on the dam, and detritus from the mine is allowed to collect in the basin. When the dam is finished a waste-way is cut past one abutment, the tunnel is blocked at its lower end, and it and the shaft then sealed tight with gravel, after which all water passes out by the waste channel. A dam of this character, over ninety feet high, has been built, and constitutes a substantial and a cheap structure, the gravel filling of the dam being selected material removed from the mine during its regular operation. The gravel was delivered on the dam in a sluice, the principal cost being that for distributing it over the surface of the dam, but which required only the labor of about three men to direct the gravel from point to point as desired.

Where the storage site is in a worked-out mining pit or upon natural level land, not subject to serious flooding during storms, light embankments of gravel or brushwork are thrown up where necessary, to close in the flat or pit and form a basin in which sediment is allowed to collect to within a few feet of the level of the top of the barriers, the height of the latter being added to, a few inches at a time, in order to keep the top about a uniform distance above the increasing level of the surface of the sediment. The water from the reservoir is passed off through a shaft and tunnel, if convenient to do so, or through a timber and plank discharge flume, or weir, across the opening of which planks are gradually inserted so as to raise the level of the escape and keep it above the mud. As no water is permitted to pass over the barriers, and their tops are kept only a few feet above the impounded detritus, the amount of material to build the barriers is much reduced, and their cost is very small.

The object of all these works is to produce a pool of dead water above the dam several feet deep and of sufficient area to form a settling basin in which sand and silt and a large part of the earthly matter will deposit, permitting only discolored water to escape from the reservoirs.

IMPOUNDING BASIN, GOPHER HILL MINE, PLUMAS COUNTY, CAL.

The cost of the dam structures is reduced by taking advantage of the fact that they are to stop solid matter and to hold back only a small depth of water, and the cost of impounding is further reduced by providing still less costly barriers above the principal works, the auxiliary barriers not being kept water-tight, but acting merely as strainers or arresters for cobbles and gravel, which are thus kept from entering and occupying space in the more expensive settling reservoirs. Thus a large percentage of the total bulk is stored at almost nominal cost.

EFFECTS OF THE CAMINETTI ACT.

Under the Caminetti Act hydraulic mining has been resumed only very partially; partly owing to reasons already stated. The act has, however, enabled a great many small mines to operate without fear of legal interference, and it has, moreover, been beneficial to all hydraulic mining interests, inasmuch as it has removed an indiscriminating interdiction of the industry and provided in place thereof an expert body entrusted with judicial powers to determine under what special conditions given mines may operate without causing damage. It has thereby restored to hydraulic mining property negotiable value.

In the second line of its duty the California Debris Commission has since 1897 been conducting investigations and making studies as to the best manner of preventing removal into the navigable rivers of the larger accumulations of detritus now in the bed of the Yuba River, and of rectifying and confining the channel of that stream. For this purpose appropriations amounting to $500,000 are available, of which sum one-half has been provided by the State of California and an equal amount by the Federal Government.

A plan of treatment has been adopted by the Commission and recommended by the Chief of Engineers, and is now before Congress for final approval.

The report of the Commission has not yet been made public, but will probably be printed in the annual report of the Debris Commission. The purpose of the project is to protect navigation and stop detritus already lodged in the tributaries of the Sacramento River, but the methods and treatment proposed for this purpose, if found effectual in practical working, may show themselves capable of enlargement and extension so as to provide for storage of hydraulic gravel deposits not yet mined, which is also an object contemplated in the Caminetti Act. There is, therefore, the prospect of a resumption of hydraulic mining upon a more extended scale.

The practical results following the creation of the Debris Commission in California have been appreciable from its creation in 1894. Each year has added to the gold production of the State in the regions where formerly placer mining was extinguished, that is, in the valleys of the Sacramento and San Joaquin Rivers, though only for the years 1897 and 1898 has the amount of the increase been segregated. The result for the year 1899 has not yet been announced by the statistician of the Mint, but is expected to show a production of $500,000 from debris mining alone. It is to be remembered also that these years have been phenomenal in respect to the small amount of rainfall, being only about one-half the average precipitation.

In 1897 the product of gold resulting from the construction of dams was $393,610; in 1898 $371,881. An approximate estimate for the seven years since 1894 would probably give over $2,700,000 as the total saved by means of the debris dams.

For the cuts used with this article we are indebted to the Scientific American.

Asphaltum at Cle Elum.

The discovery of an excellent deposit of asphaltum in the Cle Elum district is reported by Dickson and Price of Seattle. The bed is found in a quarter easily reached by the Northern Pacific road. It is said to form a blanket deposit of about 160 acres in layers varying from a few inches to several feet in thickness.

William Packwood, better known as "Old Uncle Billy," a pioneer of Olympia, discovered the asphaltum in 1882, but did not know the nature of his find and gave it little attention beyond submitting samples to an assayer. A number of years afterwards he revisited the section, but could not find his old discovery and died before locating it. Before his death, he made a rough sketch of the country from his memory of it, giving the sketch to his nephew, M. Barnett or Everett. Mr. Barnett consulted several capitalists and interested them in organizing a party to search for the deposit. Three unsuccessful expeditions were made, but finally last fall, Dickson and Price took hold of the enterprise, and after one failure to find the bed they at last succeeded in locating it in June.

Air Compressor Explosions.

Several Noteworthy Cases and Their Causes—How to Avoid the Danger of Ignition—Essential Characteristics of an Efficient Compressor

By Alfred George White.

The attention of engineers in this and other countries has from time to time been drawn to the results of explosions which have occurred in air compressors and receivers. In some cases the cause has been ascertained; but so far as the author is aware, no systematic investigation of the subject has been made with a view to obviate the disastrous results of explosions and ignitions, which the author believes to be more frequent than is generally known. The following account of a recent occurrence of this nature which came under the author's notice, with a description of the compressor, may help to throw some light on the subject.

EXPLOSION IN A COPPER MINE.

The air compressor was employed for the purpose of supplying air to rock drills and hoisting engines in a copper mine in Norway. The usual working pressure being between fifty and sixty pounds, the safety valve of the receiver was loaded to blow off at the latter pressure. It had been continuously at work for seventeen years, and was of English make, with two horizontal air cylinders twenty-four inches in diameter and thirty-six inches stroke. The motive-power was supplied by a high-speed turbine on a horizontal shaft, upon which a pinion was keyed, gearing with a spur wheel on the compressor driving shaft. On this shaft also there were keyed a heavy fly-wheel and two crank discs, which worked the air-cylinder pistons by means of connecting rods in the usual way. The inlet valves were plain circular valves with stems, four being placed in each cover of the air cylinders. Bell-crank levers fitted with counterweights were attached to the valve stems for closing the valves at the end of each stroke before compression commenced, the atmospheric pressure opening them simultaneously during the inward or inspiration stroke. The outlet valves were of the ball type, of solid brass, fitted in brass seats, two on each delivery port on the top of the cylinders, their action being regulated by the pressure of air in the cylinders and receiver.

The cooling arrangements consisted of an open water jacket round each cylinder, the water supply being admitted near the surface on one side and discharged through an overflow pipe of three-fourths inches bore on the other side at the same level. The water surrounded the cylinders and air delivery ports, and stood about one inch deep over the latter. The water supply and discharge being placed at the same level near the top, the water supply flowed over the surface and did not circulate round the cylinder. It will thus be seen how imperfect the cooling action was in this instance.

The oil used in lubricating the air cylinders was composed of crude fish oil and tallow mixed together, and was put into the cylinders through the inlet valves by a common oil can. The lubrication, therefore, depended entirely on the attention and skill of the attendant, and no doubt at times a greater or less quantity of oil was poured into the cylinders than was required, and any surplus was driven out through the delivery valves into the air pipes and receiver.

The air receiver, placed inside the compressor-house, consisted of a wrought-iron cylinder about twenty feet long by four feet six inches in diameter, and was connected to the air cylinders by an eight inch cast-iron pipe. This pipe had an ordinary spigot and socket joint on the horizontal portion between the receiver and compressor. The joint was made of lead, run in and caulked, but owing to the contraction and expansion of the pipe it leaked, and had to be renewed from time to time. On the day of the ignition, and shortly before its occurrence, this joint had been renewed by running in molten lead against a hempen gasket, and very soon after the compressor was started, flames blew out in great volume from the safety valve on the air receiver. The attendant succeeded in stopping the compressor within a few moments, but the flames continued for some time and set fire to the compressor-house, which was built of timber, and in the course of half an hour it was burnt to the ground.

WHAT CAUSED THE EXPLOSION.

The author considers the cause which led to the fire breaking out in the receiver to have been the ignition of the oil accumulated there and the use of molten lead in making the spigot joint of the pipe referred to, by which the oil must have been first ignited in the pipe. On starting the compressor, the draught of the air created would cause the ignited oil in the pipe to set fire to the oil in the receiver, or the fire may have already spread to the receiver. The products of the decomposition of the large quantity of oil in the receiver would, in conjunction with the air, form an explosive mixture, which, failing relief through the safety valve, might have resulted in an explosion. The cause of all explosions and ignitions of this nature can be traced to these phenomena. The case which occurred at the Westphalia Colliery in 1896, resulted in destruction of the air receiver by bursting. In the present instance the rise of pressure does not seem to have been sudden enough to burst the receiver, and the relief afforded by the safety valve averted this catastrophe. When the receiver was opened it was found to contain a quantity of charred oil in the form of a sticky paste about two inches deep in the bottom. The air pipes were coated inside with a similar substance. The damage done to the compressor and receiver was, however, considerable, the riveted joints of the latter being started and the lead joints of the contiguous pipes and connections melted out. One cylinder of the compressor and one crank disc were cracked, as also were two arms of the turbine, which was placed inside the house burnt down. The latter effects were chiefly due to the subsequent fire and the water which was thrown upon the heated metal.

The primary cause of the fire was the accidental ignition of the oil by the admission of molten lead into the pipe referred to, but the same effect may be produced by an increase of air pressure, and consequently of temperature, to a point at which the decomposition of the oil and ignition of the air and gas mixtures takes place, or by the admission of coal dust or inflammable matter into the valves or cylinders of the compressor. The use of oils possessing low-flashing temperature from friction of metallic surfaces improperly lubricated are also an element of danger, besides defective water-jacketing and cooling arrangements.

TEMPERATURE OF COMPRESSED AIR.

The temperature of air when compressed adiabatically to 58.8 pounds per square inch gauge pressure from 60 degrees F. initial temperature is 270 degrees F. The air admitted to a compressor is, however, sometimes at a much higher temperature than 60 degrees F., and may in some instances be as high as 100 degrees F.; the temperature of this air when compressed to 58.8 pounds per square inch gauge pressure will rise to about 430 degrees F., and when compressed to 75 pounds per square inch the final temperature is nearly 500 degrees F. This shows the importance of a low initial air temperature, adequate cooling of the air before or during compression, and the use of lubricating oils of high-flashing and ignition points.

A similar ignition to the one mentioned by the author occurred in 1897 in the Clifton Colliery air receiver, and tests were made of the oil then in use, giving the following results:

	Flashing Point Close Test.	Ignition Point.
Sample No. 1.....	454 deg. F.....	594 deg. F.
Sample No. 2.....	460 deg. F.....	588 deg. F.

Lubricating oils of high-class manufacture, distilled from petroleum and used for high pressure steam engines, give flashing points of from 530 to 560 degrees F. (open test), and ignition points of from 600 to 630 degrees F. It is, however, sometimes the case that oils having a high flashing point are mixed with others having a much lower one, and therefore a guarantee should be demanded, or a test of the oil should be made. The flashing point of the oil used in the compressor described by the author, taking that of Arctic sperm, would be only 446 degrees F.

It is evident that, given reliable oil of high-flashing point and normal conditions of working for a well designed air compressor, the danger of ignition is practically eliminated.

The final temperature of the air will, of course, be diminished when the air is cooled during the compression, in proportion to the efficiency of the cooling apparatus; and in hot countries, where the initial temperature of the air is high, the addition of an apparatus for cooling the air prior to admission to the compressor, in addition to the other cooling arrangements, would be attended with economical and advantageous results.

POINTS TO BE REMEMBERED.

With reference to the design of air compressor, the author is of the opinion that the following points require special attention: (1) The arrangements of the air admission to the compressor in such manner that the lowest possible initial temperature is obtained, and the air protected from all dust or inflammable material and sparks. (2) Efficient water-jacketing of the air cylinders by closed jackets, with water supply under pressure, and, in the case of double storage compressors, an intermediate cooler of adequate capacity. (3) The more general adoption of compound or double-stage compressors with intermediate coolers, whereby a more effective cooling of the air and greater economy of power are attained. (4) The employment of automatic lubricators on the air cylinders. (5) The use of pyrometers, whereby the temperature of the air in each cylinder and in the receiver can be seen by the attendant. (6) The reduction of the clearance at the ends of the cylinders and the valve ports to a minimum. (6a) The design of valves having definite action, without friction in working, of ample area and readily removable for inspection or cleaning. (7) The use of tested oils having high flashing points. (8) Proper arrangements for draining and blowing off accumulated oil in both air receiver and pipes.

MONITOR IN OPERATION AGAINST A 300-FT. BANK.

About two years previous to the ignition described by the author, an explosion occurred in one of the cylinders of the same compressor, resulting in destruction of the cylinder. The cause of this was not ascertained at the time, but it was probably due either to excessive friction in the cylinder or defective action of the valves, causing an increase of temperature and consequent decomposition of the oil, or to an increase in the air pressure sufficient to burst the cylinder.

The production of fire by means of the sudden compression of air is known to the aborigines

of the Philippine Islands, who employ a small tube fitted with a plunger which on being sharply struck, ignites combustible matter placed at the bottom of the tube.*

Bituminous Coal Mining Operations of the Past, Present and Future.

History's First Records of Coal Mining—The Fable of Houillos—As to the First Use of Coke—A Shock for the Modern By-Product Man.

By Fred C. Keighley, Oliver, Pa.

Though there is every probability that both the Grecians and the Romans were aware of the properties of fossil fuel, there is no positive evidence that they ever mined it for fuel purposes. It is mentioned by ancient authors as lithanthrax, meaning stone coal, and in our own days it is represented by the Italian word litantrace. Theophrastus, Aristotle's favorite pupil, states in his Treatise on Stones that coal had been found in Liguria and in Elis.

The reason that coal was not mined in the earlier historical periods may be accounted for by the fact that the cradle of the human race was well within the tropics, and there was not that need for large supplies of fuel that there would have been in the colder zones, and no doubt when the human race did migrate to the colder zones, the forests and peat bogs undoubtedly furnished ample supplies for their requirements until the Christian era. Moreover, in the warmer countries, such as Italy, Greece, Egypt and Asia Minor, the coal measures are of rare occurrence; so even if necessity, and necessity is the prime stimulant to all discoveries, had compelled them to look to other sources than the forests for their supply of fuel its discovery would have been exceedingly difficult.

Within the present century immense areas of coal-bearing measures have been found in China and India and also in Africa, but with the exception of China there are no evidences that any of it was mined by the ancients. The missionaries report that there are evidences that in China coal had been mined in a crude way long before the birth of Christ.

In Provence, France, the Aqueduct Forum Julii passes through the very heart of the coal formation at the foot of L'Esterel, and the coal beds are actually laid bare. In the Lyonnaise, one of the subterranean branches of the aqueduct carrying the waters of the Gier to the Capital beloved by Claudius actually cut through the coal, yet it caused no further investigation into its constituents or possibilities, for no mining was done in the seam further than that necessary for the passage of the water. So that it seems that the Romans in the time of the Caesars certainly knew that coal existed. Coal has been found amongst the ruins of the Roman Uriconium—the modern Wroxeter in England. In Great Britain there are many evidences that coal was found there by the Romans at, or shortly after, the invasion, and even the ancient Britons seem to have had a similar knowledge of it.

IN THE ANGLO-SAXON DAYS.

During the Anglo-Saxon period coal was certainly worked, but it probably did not extend beyond the outcroppings, and the workings would likely be of the nature of quarries. In 1259, Henry the Third granted a charter to the freemen of Newcastle by which they were allowed to dig for coal. In 1306, Edward the First issued a proclamation forbidding the importation of coal. Coal mines were worked in Wales and Scotland during the thirteenth century, and coal was worked in Yorkshire, the county I was born in, in the fourteenth century, and also in the counties of Northumberland, Durham and Derbyshire. During the sixteenth century there are numerous records of the coal mining industry, and over 4,000 ships were engaged in carrying coal during the year 1615, not only along the coast of England, but to the coasts of France, Germany, Holland and adjacent countries, and there were also foreign ships engaged in the trade in addition to the number named. Numerous attempts were made to smelt iron with coal during that century, and Dud Dudley not only succeeded in doing that, but actually established iron works, and coal was mined in large quantities.

*Transactions British Inst. C. E.

In looking up the old records of coal mining I ran across something that is very interesting to me. On page 26 of "Keighley Past and Present" (by the way Keighley is my birthplace), I find the following, which I have copied bodily: "As this Sir Henry Keighley thrice represented Lancashire in Parliament, it is not improbable that he would be one of the members who, in the year 1667, complained to the king that coals were so generally used that the air was infected; in consequence of which two proclamations were issued prohibiting their further use in the metropolis, and containing strict orders to inflict fines, and destroy all furnaces and kilns where coal fires should be found. This strikingly illustrates the power of prejudice; and the slowness of the public mind to admit and appreciate great discoveries."

This author says: "We may reasonably infer that wood and peat would be the only fuel consumed here at this period of 1667." I think that this writer refers only to the town of Keighley in the last paragraph given. I might add that in my boyhood's days at Keighley my father used to buy an occasional load of peat, though I think he did it more for the sake of old traditions than anything else, for he also was very partial to a Yule log at Christmas time, though he had to burn it on a coal grate. Even now I have visions of the old peat bogs, and I fancy the perfume of the ling is deliciously near me.

It seems that coal was worked in Belgium during the twelfth century near the village of Plenevaux, near Liege. Coal was worked in France during the fourteenth century. There is a delightful fable mixed up with the finding of coal in Belgium that I cannot refrain from repeating word for word as I read it in that great French work of Louis Simonin, to which volume I am indebted for some of the valuable information in this paper.

THE STORY OF HOUILLOS.

The chroniclers give it as follows: "Houillos, a farrier at Plenevoux, was so poor as not to be able to earn enough for his wants; not having, very often, bread to give his wife and children. One day, being without work, he had almost made up his mind to put an end to his life, when an old man with a white beard entered his shop. They entered into conversation. Houillos told him his troubles; that being a disciple of Saint Eloi, he worked in iron, blowing the bellows himself to save the expense of an assistant. He could easily realize some advantages if charcoal were not so dear, for it was that which ruined him. The good old man was moved even to tears. 'My friend,' said he to the farrier, 'go to the neighboring mountain, dig up the ground and you will find veins of black earth suitable for the forge.' No sooner said than done. Houillos went to the spot pointed out, found the earth there as had been predicted, and having thrown it into the fire, he proceeded to forge a horse shoe at one heating. Transported with joy he would not keep the precious discovery to himself, but communicated it to his neighbors, and even to his brother farriers." A grateful posterity has bestowed his name to coal (Houille is French for coal) and in this respect he has been more fortunate than many other discoverers. His memory is still cherished by all the miners of Liege, who, of an evening relate the story of the honest collier, or of the old coal miner, as they delight in styling Houillos, the farrier of Plenevoux. The miners say it was an angel who revealed to him the spot where the coal was.

I have an old book in my possession, printed in 1799, entitled "General view of the Agriculture in the county of Perth with observations on the means of its improvement. Written by James Robertson, D. D., Minister at Callander, in the County of Perth," that I am going to quote from, as it is particularly interesting: "It is singular, that although most of the counties in the South of Scotland abound in mines of pit-coal, yet none has hitherto been discovered North of this county. The Ochill hills crossing the county, and the same chain under other denominations, crossing the counties of Stirling and Dumbarton on the West, and those of Fife and Forfar on the East form a great dyke from sea to sea which seems to be the barrier that nature has placed between the coal countries and those which have none. From Blairingone (the field of hounds) which is the property of the Duke of Athol and situated on the south side of the Ochills, the adjacent country, the west end of Strathcona, and part of Breadalbane, are supplied with this useful fuel, in addition to their peats."

THE EARLY DAYS OF COKE.

An account is also on record of the ingenious experiments of the Earl of Dundonald (I think this must have been the grandfather of the Lord Dundonald who has so greatly distinguished himself in South Africa under General Buller and Lord Roberts) who built ovens of a peculiar construction for the burning of pit coal of his own and other estates into coke, and at the same time preserved the oil and tar in separate receptacles. This is indisputable evidence that the by-product coke oven is a creature of the last century. I am glad this worthy old preacher did not exclude foreign matter, or I could not have turned this up a century later, to the disgust of the modern by-product man. The Reverend goes on to say: "Coke (mark the words) has been long in use and found well adapted to excite a most intense heat in smelting ores and other chemical operations. It is also calculated for drying malt to which the acid, the oily particles and phlegm of uncharred coal would be detrimental.

It thus seems that the merit of procuring coke and at the same time preserving the other useful ingredients, formerly lost in charring pit coal is justly due to the Earl of Dundonald. It appears to be highly probable that coals were discovered by the inhabitants of this island, before the Roman invasion, from circumstances taken notice of by some historians; but while the forests were extensive on all hands and of little value, the fuel in common use was wood. As the latter became scarce, the people had recourse to the former. The first public notice taken of this matter by government was in 1272, which is the date of a charter granted by Henry the Third to the town of Newcastle. Our authority says further: "The district of Culcross not only claims the invention of extracting pitch from coal, but the most singular coal work ever seen in this part of the world was carried on near that place. In the middle of the Frith and under the sea, opposite to Kincardine, a round wall was built, higher than the sea at full tide, inclosing the mouth of a coal pit, where ships drawing twelve feet of water received the coal from the bucket. A disastrous accident, occasioned by an uncommon swell of the sea, put an end to this undertaking. In the year 1792, a small subscription was raised in Strathcarn to defray the expense of searching for coal in the property of Lord Perth, near Auchterarder. Favorable symptoms were then discovered by persons acquainted with the business, who reported if a thorough search were made by boring, that they had no doubt of coal being found in that moor."

This is all of this book that I can take space for, but I want to say right here that I have found much in it that heretofore I thought were recent discoveries, and my opinion of the present age is several pegs down to what it was. When I get time I am going to plow up some more of the field that has lain in fallow so long, and I am sure of a rich harvest.

(To be Continued.)

Trade Opportuniries in Mexico.

D. Campbell Davies & Co., of Durango, Mex., have established an office at that place, from which they intend to conduct an extensive retail business in machinery lines as the representatives of United States houses. They have just issued a letter in which they announce that they have perfected and completed a system of obtaining advance information through newspaper correspondence from every mining company of note in Mexico, Central and South America where mining machinery and supplies are needed. They say they are thus enabled to place orders on a commission basis at little or no expense to the manufacturers. Their letter says further: "We therefore desire to secure the agency for your supplies and machinery for the Republic of Mexico, Central and South America, and kindly ask you to quote us your very best prices, with our commission allowed, and forward to us your printed matter, with instructions. We are sure that by employing us as your agents you will find that we can represent your interest in the said countries to far better advantage and at less expense than the majority of agents, as we are in direct connection with the most prominent firms in Mexico and South America, especially relating to mining machinery and ore-milling plants, also smelting machinery and supplies. We make it a specialty, and therefore carry a great deal of weight in that line of business. Reference and testimonials will be forwarded to you if required."

The Anthracite Coal Strike.

The latest reports at hand as we go to press indicate that the strikers in the Pennsylvania anthracite regions are rapidly gaining ground in their contest under the leadership of the United Mine Worker America. The strike was ordered to begin on Monday, September 17. At the start it was a mutual disappointment—to the operators who saw more or their men staying away from the mines than they had expected would leave them, and to the promoters of the strike, whose predictions that practically the entire region would be tied up from the beginning failed of verification. From day to day, however, the number of strikers seems to have increased, while those who still persisted in working wavered and in most cases surrendered to the arguments of the labor agitators.

The shut-down in the northern field known as the Wyoming and Lackawanna region was practically complete on the first day of the strike, but in the southern fields known as the Schuylkill and Lehigh regions, the miners were more reluctant to leave their work. The first estimate was that 80,000 men were out and this number has gradually grown to something like 120,000.

The operators made a determined effort to break the strike, and on Monday, September 24, hoped to see many of their idle collieries resume operations. They were sadly disappointed and found that their situation had become more serious, rather than otherwise. At that date there seemed to be less likelihood of resort to violence, but the leaders in the strike movement had gained new confidence from some source and were predicting that the tie-up would soon be complete. At Shenandoah, where the first serious outbreak of the strike had resulted in bloodshed, order had been restored, but the attempt of the operators to work their collieries failed absolutely. It was then predicted that all of the Philadelphia and Reading Coal & Iron Co.'s thirty-nine collieries, which had been among the most reluctant to quit work, would within a few days be idle.

The points at issue in this big contest as outlined by the strikers appear in concise form in the statement of grievances, issued by President Mitchell of the United Mine Workers of America on September 13. The claim is that while the wages of anthracite miners have for many years been less than $250 annually, the cost of the necessaries of life has increased over twenty per cent, and that the increased cost of living which is not made good by a corresponding advance in wages amounts practically to a reduction of wages. It is stated also that while the laws of Pennsylvania make 2,400 pounds a ton, the anthracite coal miners are compelled to consider from 2,700 to 4,000 pounds a ton, and that they are also charged heavily for impurities that may be sent out with the coal. The miners are obliged to purchase powder from their employers at the rate of $2.75 a keg, while it is asserted that the same powder can be bought elsewhere for $1.50 a keg, and at wholesale for $1 a keg. Another source of trouble is the company's store, where many miners are compelled to trade. It is said that the miners must also pay the company $1 a month for a doctor whether they require his services or not. The miners assert that all efforts to secure a betterment of these conditions have failed, saying that the coal companies and coal roads have uniformly declined to treat with them.

On the other hand, the operators, without advancing convincing arguments to meet the specific complaints of their men, declared that they will not submit to dictation from labor agitators, claim that a majority of their men are satisfied with their present arrangements, and believe that the strike is brought on at the present time at the instance of politicians. One operator has said that he was told as long ago as March that a strike was to be precipitated just as the presidential election was nearing its crisis. For these reasons they say they will not submit to the dictation of labor agitators without a determined fight.

Amalgamated Scale Signed.

Finally after many conferences and much controversy the representatives of the Republic Iron & Steel Co. and the American Steel Hoop Co. and the committee of the Amalgamated Association of Iron and Steel Workers reached a wage scale agreement on the morning of September 23. The agreement made it possible for 60,000 iron and steel workers of the Amalgamated Association, who had been idle since May, to return to work. It is believed that if the settlement had been delayed a single day longer a strike or lockout would have been inevitable. The Amalgamated men wanted to continue the scale of last year, which was reckoned on a basis of $5 a ton, while the operators demanded a reduction to a $4.50 basis on account of the lower prices of the product in the market. The argument as to lower prices was met by the Amalgamated men with the assertion that the operators control the price as they do the output.

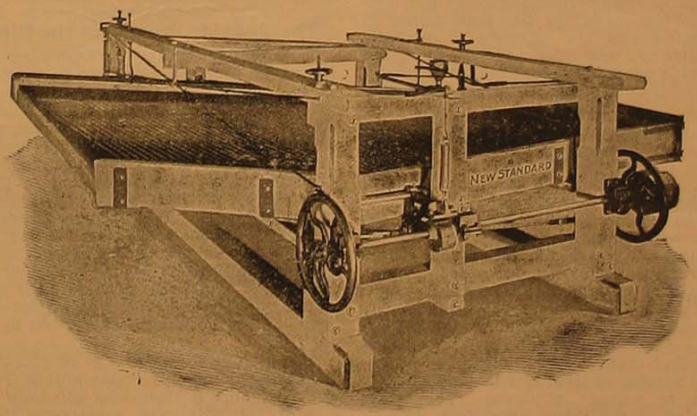
The new scale is in the nature of a compromise and is on a minimum basis of $4.75. It will go into effect sixty days from the signing of the agreement, and if in the meantime the market price of the product should increase the wages will be advanced from the $4.75 basis. The Advisory board of the Amalgamated Association is to be allowed to examine the books of all the plants operated by the two companies. This concession has for some time been virtually practiced, and in the course of the conferences the operators earnestly urged the Amalgamated committees to inspect their books at stated periods of sixty days.

One effect of the signing of the new agreement will probably be the resignation of T. J. Schaffer, president of the Amalgamated Association. He had been accused at one of the conferences of being an obstacle in the way of an agreement. Notwithstanding his disappointment, it is said that the workers in general are well satisfied with the new scale. The operators likewise profess to be pleased.

The announcement of the yearly scale is usually made in July, but this year the unusual variations in the market rendered everything uncertain and made it impossible for an agreement to be reached. As soon as the scale was signed, messages were hurried off in all directions to the various mills affected and arrangements were immediately begun for the opening of the mills at the earliest possible moment.

The New Standard Concentrator.

Engineers and inventors have for some time past been working on a new patent concentrator, which they have at length perfected at Los Angeles, Cal. A little model not more than twenty-four inches in length, which they used in their preliminary experiments, gave great satisfaction, but the inventor declined to be satisfied with half-way results, and kept working with the idea that he could make a machine that would run lighter and use less water than the one he had. His model had one other objection, which, however, was held by him alone, and that was the number of its working parts, although at that time the machine had no more working parts than many others. The inventor, however, wished to reduce them in order to diminish the cost of the machine, and at the same time facilitate its lighter running. Time, money and patience were expended for two years in these experiments, until the inventor now has a machine perfectly satisfactory to himself and associates, and the result of all the hard work is now introduced to the public as the New Standard Concentrator. Mining people who have bought the new concentrator and are now using it are lavish in their compliments, and it would certainly seem that the manufacturers have been successful in their endeavors to produce a more effective machine at a smaller cost. The New Standard Co., the makers of the concentrator, announce their machine in the following words: The New Standard Concentrator establishes a new standard for concentrating ores. It effects a larger saving of mineral. It requires less attention, has greater range of adjustment and requires a less amount of water. It is the lightest running concentrator ever made, requiring less than one-quarter horse-power. The New Standard Concentrator has fewer working parts than any other ore concentrator. Our No. 2 machine has a capacity of fifteen to thirty tons per day of twenty-four hours, depending upon the per cent of concentrates in the ore. The weight of No. 2 machine crated is 1,600 pounds. Machines now in use are doing better work than has ever before been done by any ore concentrator. A careful examination of the merits of this machine will convince the mining public of its superiority in all points, thereby establishing a new standard.



THE NEW STANDARD CONCENTRATOR.

Greene Consolidated Copper Co.

We have received an official report of the meeting of the stockholders of the Greene Consolidated Copper Co. held at 27 William St., New York City, on September 7. A letter was read from George S. Robbins, who had recently visited the mines of the company at La Cananea, Sonora, Mexico. Mr. Robbins says the property is about ten times as big as it looks on the company's map and he reports that rich ore is in evidence in many places. Extensions are being made on the smelter, but it will be some time before the smelter is ready to start. As soon as it is ready, however, the company will be ready for production. Messages were also read from Professor Robert J. Hill of the United States Geological Survey, who recently visited the property at the request of Walter S. Logan, treasurer of the company. Professor Hill says that mining, smelting and transportation conditions are of the best, and that ore is abundant, available and lasting.

Houghton County's Growing Payroll.

A census of the mine workers of Houghton county, Mich, has been taken by Capt. Josiah Hall, mine inspector for the county. The census will be reported to the County Board on October 1. It was generally anticipated that this census would show a falling off from the figures of one year ago, owing to the letting out of nearly 800 men by the Arcadian and decreases in forces by other new mines which have completed surface improvements that required many men. The figures are not completed, but will show a gain rather than a decrease.

Following is a table showing the number of men employed by the mines of Houghton county for a period of ten years, the figures for the present year being a close estimate:

1890	7,310
1891	7,702
1892	7,640
1893	7,591
1894	7,348
1895	7,249
1896	8,170
1897	8,726
1898	10,469
1899	13,051
1900	14,000

By these figures it will be seen that the number of mine employes in the county has practically doubled in five years. In addition to these figures, nearly 2,000 men are now employed in the mines of Keweenaw and Ontonagon counties, where barely 200 were working in 1895, giving at least 16,000 men now working in and around the mines and stamp mills of the Michigan copper district.

The American Mining Engineer.

Charles H. Fitch of Chicago has addressed the following letter to the editor of the Mining Journal of London in reply to the communication recently printed in that publication over a fictitious name, bitterly attacking the American mining engineers in South Africa:

"You recently gave space to a long anonymous article depreciating American mining engineers. To this a few sensible words of rejoinder seem in order. Consider the vastness of mining and metallurgical work in the United States, the many thousands of assayers, metallurgists, and engineers employed in this work, the many well-equipped training schools and laboratories in which they are educated for the competent performance of their technical duties. Your correspondent, in his long article, offers to give more facts and names than he does, and, in the interest of general information, is invited to do so. He mentions only one name—that of an inventor or process man, who is not a member of the American Institute, and whom we would not class among the trained metallurgists of American origin. He mentions one fact, that millions have gone to waste in tailings in South Africa, but he does not state the vastly greater value saved. The great saving due to the McArthur-Forrest process has never been claimed for American engineers, and does not belong to them. The work they have done in South Africa has not been notably a work in assaying. It has been executive work, the management and control of large physical enterprises with a grasp of all the requirements. This ability your correspondent seems by his very one-sidedness unfitted to appreciate or understand. He reminds us of the criticism of the Arab on the leader of the orchestra, who seemed to the child of the desert as a useless appendage, a player performing with a stick on an invisible instrument. Still, people who understand music do not make light of the work of the leader.

"All that is asked is reasonable fairness, not narrow provincialism. For my part I am desirous of seeing metallurgical work improved and advanced. I respect and appreciate fully the good work of English and Colonial engineers and metallurgists. When something has been gained in human progress and the conquest of material forces, I praise the man who made the gain, and my approbation never hesitates to ask first whether he is Colonial or English, or United States."

Accidents in Pennsylvania's Anthracite Mines.

James E. Roderick, Chief of the Bureau of Mines for the state of Pennsylvania, has sent out his report for the year 1899. Embodied in the introduction are interesting figures regarding accidents in the anthracite and bituminous mines of Pennsylvania. Tables are presented, from a superficial glance at which the inference might be drawn that there has been a great increase in the number of lives lost in and about the anthracite region. A closer study of the figures, however, shows that there has been a gradual diminution in the number of lives lost in proportion to the number of persons employed. The tables cover a period of the thirty years from 1870 to 1899 inclusive. The number of lives lost in the first decade after the passage of the first mine law, which was enacted in 1870, was 2,151, or an average of 215 a year. In the second decade embracing the period between 1880 and 1889 inclusive 3,119 persons lost their lives through accidents, or an average of 311 a year. In the third decade, from 1890 to 1899 inclusive, 4,305 persons lost their lives in and about the anthracite mines, an average of 430 a year. Thus, in the thirty years during which the anthracite mine law has been in operation 9,575 persons have lost their lives, or an average of 319 a year. In commenting upon these figures Mr. Roderick says:

"It is conceded by all who are familiar with the subject that the anthracite law of this state is the best on the subject in the world, therefore, it is the opinion of the writer that this loss of life is not caused through any defect in the law, neither is it the fault of the mine inspectors, who are a most intelligent and hard-working body of men, and thoroughly practical. Probably some neglect may be imputed to the superintendents and mine foremen of some of the collieries, but the principal causes of the accidents can be truthfully traced to the neglect of the employees themselves. The writer claims that the mine law has been the means of greatly reducing the number of accidents in and about mines, and he will endeavor to prove this assertion by figures."

Mr. Roderick substantiates his statement by showing that in the first period, 1870-1879, for every thousand persons employed 3.839 lost their lives. In the second period, for every thousand employed 3.210 were killed, while in the third period the number was 3.140 for every thousand employed. Mr. Roderick also points out that the dangers connected with the mining of coal have greatly increased within the past ten years, owing to the greater depth of the mines, the great increase in the territory covered by mine excavations, the increase in the quantity of explosives used and in the quantity of explosive gases encountered, and the difficulty of properly ventilating the deep mines. Notwithstanding these considerations, he believes that the principal cause for the large number of accidents reported is found in the large percentage of unskilled and unintelligent non-English speaking miners and laborers who have been employed in and about the mines in the last ten years.

Under the present conditions, he says, he is doubtful if any better results will be obtained in the next decade, as it is a well-known fact that the dangers resulting from the mining of anthracite coal are increasing each year; and unless the unskilled laborers of the present should improve greatly in the practical knowledge of mining and use all known precaution while following their hazardous occupations, better results cannot be expected. The English speaking employees, Mr. Roderick says, can also help greatly to reduce the number of accidents by vigilance and care in the performance of their duties, thus setting a good example for their fellow-workingmen who are not familiar with the English language.

Referring once more to his table, Mr. Roderick says that in the first decade an average of only 86,436 tons of coal were produced per life lost. In the second decade, 108,387 tons were produced, while in the third, 109,232 tons was the average production per life lost. From these figures it may be seen that the average quantity produced per life lost has been increased in every decade, and while the average increase in production in the third decade over that of the second was small, yet it shows that 845 more tons were produced for every life lost.

The Cyanide Process in the Black Hills.

It was reported early in September that within six weeks fourteen new cyanide plants would be in operation in Lawrence county, South Dakota, and that at least five more will be built before the close of the year. The cyaniding of the low-grade ores in the Black Hills has been receiving much attention during the past year. Costly experiments have been made, but in nearly every case the results have justified the outlay, and it is significant that there is now more demand for low grade propositions than for any other kind. At present the actual cost of gold extraction by the cyanide process in the treatment of the low grade ores, ranges from $1 to $2.50 a ton, while on certain classes of ore extractions have been made as low as ninety cents a ton in experimental tests.

The Portland Mining Co. of Clinton, Ia., has purchased the twenty-stamp mill at Gayville from the Baltimore & Deadwood company of Chicago.

A cyanide plant with seventy-five tons daily capacity is nearly completed next to the stamp mill. The company will ship ore from the mines at Portland.

The Shawmut Gold Mining Co. of Boston has purchased the Esmeralda mine and mill in Blacktail Gulch and a fifty-ton cyanide plant is being built. Ore will be crushed and immersed in the cyanide bath.

In the Squaw Creek district the Cleopatra Mining Co., a South Dakota concern, has completed a 100-ton plant and the first test run was successful. Ore is a quartzite and large bodies have been blocked out.

At Rapid City, Howell Clevenger, a student in the State School of Mines, has nearly completed a cyanide plant with a daily capacity of thirty tons. He will treat the tailings from the old chlorination works in that city, which contain about $10 a ton in gold.

Allen Small and associates of Ragged Top are operating a twenty-ton plant in Calamity Gulch on ten-dollar ore. The plant is paying big profits.

The South Dakota Mining Co. of Deadwood is running thirty tons of ore from the Portland district through a plant at Central City. The plant is to be enlarged.

Cook & Parker of Deadwood are operating a thirty-ton plant at Gayville, ore coming from the Omega mine at Terraville. The ore is in cement formation and averages about $10 a ton gold.

At the Deadbroke mine R. M. Maloney of Deadwood is running a plant on thirty tons of cement ore a day from the Deadbroke mine. Ore is stamped first and then immersed wet in the cyanide solution. This cement ore yields easily to the process.

McAllen, Halloran and associates of Lead have been operating a twenty-ton plant in the North Lead district for one month. The plant is to be enlarged. Several thousand tons of ore are blocked out in the mine.

These plants are running daily and they have demonstrated that a very large part of the low-grade ore in the Black Hills can be successfully treated by this process.

Within six weeks the 250-ton plant of the Spearfish Mining Co. which is being erected at Ragged Top, will be in operation. It will treat a lime ore, valued at $10 a ton gold. The bodies of ore are very large and close to the surface.

The Homestake Company expects to have the mammoth cyanide plant at Lead completed and ready for ore in thirty days. It will treat the tailings from the stamp mills which carry about $1.50 a ton gold.

The owners of the Wasp No. 2 mine and others in the Yellow creek district are building a fifty-ton plant which will treat the great quantities of twelve-dollar ore in the camp.

The Detroit and Deadwood Co. of Detroit, Mich., has a 100-ton plant, completed two weeks ago, running on ore leased from the South Dakota company. The first runs were very successful. The plant will run full capacity on the company and custom ore. It is located on Annie Creek, south of Ragged Top.

The Northwestern Gold and Silver Extraction Co. of Chicago has a lease on the old cyanide plant located in this city, and ore is being treated from the Kicking Horse and Maggie mines, at the head of Blacktail Gulch; capacity, seventy-five tons a day.

Los Angeles to Salt Lake by Rail.

General Manager F. K. Rule of the Los Angeles Terminal Railway is credited with the following statement in relation to the proposed railway from Los Angeles to Salt Lake City, to be built by his company, which recently purchased the Los Angeles Terminal Railway: "Work on the construction of the line to Salt Lake City will be in full swing within three months. We have abundant capital for the purpose, and will not be put to the necessity of issuing bonds to pay the cost of construction. This is simply a fulfilment of the plans in view ever since the terminal was organized, and has been delayed until now largely on account of the delay in the improvement of San Pedro harbor. Surveyors are at work now on a line eastward from Los Angeles. Our first objective point is San Bernardino, a distance of sixty miles. From there the road will go forward to Salt Lake City. We shall not build to any western extension of the Union Pacific or the Rio Grande Western. We shall not stop until we have reached Salt Lake City, where we can connect with all transcontinental lines having termini there. The surveys, which are in charge of Henry Hawgood, for many years with the engineering department of the Southern Pacific, will be pushed with all possible speed and the actual construction begin within three months."

Centennial-Eureka Affairs.

Officials of the Centennial-Eureka Mining Co. say that the property is in a better condition than ever before. For every ton of ore extracted two tons have been opened up, and the latest estimate is that the ore in sight will show a net profit of $2,500,000, requiring about six years' work to get it out, at the present rate of production. The talk of a consolidation with the United States Mining Co. is declared to be nonsense. No consolidation is likely at the present time, and if such a combination should be considered, influential interests control sufficient stock to defeat any measure which would not benefit the Centennial-Eureka shareholders. Contrary to reports, no suit has been brought against the Centennial-Eureka to recover damages for the alleged extraction of ore belonging to the Eureka Hill Co. The claim is that the Silver Gem vein on the Eureka Hill property apexes on the Centennial-Eureka and that the latter company has been extracting ore which did not belong to it. Richard A. Parker, one of the consulting engineers who has examined the Eureka, says that the claim is absurd.

Under the Centennial-Eureka's contract with the American Smelting & Refining Co. it will earn about $4 a share annually. The contract is not

thought to be a specially advantageous one, and there has been talk of breaking the contract, though such a step is not likely at present.

Colombia's Precious Metals.

William L. Scruggs, writing of the precious metals in Colombia, says that the gold and silver mines of that country are far richer than those of California or New Mexico. He believes that there is only wanting labor, a stable government, scientific appliances and facilities for rapid and cheap inland transportation to make Colombia one of the most productive countries, as well as one of the most desirable for residence on the continent. The commercial possibilities of the country are almost incalculable, and the time is probably not very remote when the fact will be more fully realized by the great commercial powers of the world. There are almost no means of interior transportation. There are not more than 100 miles of regularly operated railway in the whole republic, even including the forty-seven miles across the isthmus. The entire transportation in the interior is by pack mules and peones, just as it was three centuries ago.

Sale of the Camp Bird.

The latest report from Denver is that the proposed sale of the famous Camp Bird mine at Ouray to the Alfred Beit Syndicate, London, will not be concluded. John Hays Hammond has continued his examination of the property, but Thomas F. Walsh, the owner, has, according to report, sent a cable message to England declining to extend the option and raising the purchase price from $6,500,000 to $10,000,000.

A Strike at Stratton's Independence.

Stratton's Independence, one of Colorado's most famous mines, was shut down on September 23, because of a rebellion among the men against a new regulation calculated to stop the theft of valuable ore. The managers of the mine have been greatly troubled for a long time by persistent stealing, and believe that they have lost hundreds of dollars daily. Finally they issued an order compelling every workman to change every article of his clothing before leaving the mine. The men immediately rebelled against this regulation, and when it was announced laid down their tools. The management insists that the mine will remain idle until enough men apply for work to enable it to resume.

Advanced Wages in Washington.

It was announced in Seattle recently that an advance of from eight to fifteen per cent in wages had been made by the Pacific Coast Co. to take effect immediately. The advance affected nearly all the workmen at Coal Creek, Newcastle, Lawson and Franklin, and directly concerns over 750 coal miners and employees. Superintendent W. E. Pearce of the Pacific Co.'s coal department says that there was no special reason for the advance except that the company realized that wages in other fields of labor had advanced recently, and that his company wished to maintain its reputation for fair treatment of its men. The miners had made no demand for the increase. Separate scales had to be provided for each mine because of varying conditions.

The Olympic Mining Co.

We have received from the Olympic Mining Co. of Seattle, Wash., a copy of an interesting letter addressed to the company by J. D. McIntyre, who has recently been north examining the company's holdings in the Ketchikan district. Mr. McIntyre was accompanied by ex-Senator J. W. Range. They were sailing on the Typhoon from Ketchikan to Duncan Canal, Kupernoff Island, when they sailed into a small harbor on the southwest side of Worwodski. Going ashore with pick and hammer to see what they could find they ran upon a big ledge which, Mr. McIntyre says, proved to be a great body of pure white ore about forty feet wide. They posted a location notice on a tree in the name of the Olympic Mining Co. Pan tests of the ore showed free gold running over $1,000 a ton from the surface croppings. This was from a picked sample. Fire assays from samples taken from the whole ledge gave over $14 a ton. They made another pan test, getting over forty colors in the pan and making over $30 to the ton.

Latest Mining Decisions.

Specially prepared for THE MINING AND METALLURGICAL JOURNAL.

Where a third party, who owned land on which there was a placer mine, used water from a certain ditch to operate the mine, as long as the land remained in his possession, such use made the right to appropriate water appurtenant to the land, and it passed with the land under the deed thereof. Mattis vs. Hosmer et al., 62 Pac. Rep. (Or.) 17.

Under evidence that 1,500 feet running southerly along the ledge from plaintiffs' northern stake and shaft, as described in their notice of location, would end a short distance north of what plaintiffs claimed to be their southerly end line, the court properly confined plaintiffs' claim to the limit of 1,500 feet. Conway et al. vs. Hart, 62 Pac. Rep. (Cal.) 44.

Notices of location which state that the undersigned had located the ground for borate mining purposes, and describing the claims as 1,500 feet long by 600 feet wide, are good notices of location of placer claims, there being no difference between placer and lode locations in this regard. McCann et al. vs. McMillan et al., 62 Pac. Rep. (Cal.) 31.

Notices of location of a mining claim which describe it as bounded on the east by the H. mine, and as being a quarter of a mile south of the B. road, and about three miles east of C., sufficiently describe the claim with reference to natural monuments, since notices of location are liberally constructed. McCann et al. vs. McMillan et al., 62 Pac. Rep. (Cal.) 31.

Under Rev. St. U. S. §2324, requiring location of mining claims to be distinctly marked on the ground so that the boundaries can be traced, and that records of mining claims shall contain the name of the locator, the date of location and such description of the claim with reference to some natural monument as will identify it, it is not necessary that the record shall show that the claim is marked on the ground. McCann et al. vs. McMillan et al., 62 Pac. Rep. (Cal.) 31.

The law will not hold the locator of a mining claim to a strict and technical observance of the statute in respect to the terms of his notice, so long as he substantially complies with its requirements; and if it appears that the location was made in good faith, and by any reasonable construction, in view of the surrounding circumstances, the language employed in the description will impart notice to subsequent locators, it is sufficient. Wells vs. Davis et al., 62 Pac. Rep. (Utah) 3.

Objection to the admission of the record of mining claims of a special district in evidence, without proof that there was such a district and custom requiring a record, and that the book came from the proper custody, is not well taken, where the pleadings admitted that the claims were in the district, and the complainant alleged, and was supported by proof, that G. was the recorder of such district, and G. was called by both sides to produce the record of their location notices. McCann et al. vs. McMillan et al., 62 Pac. Rep. (Cal.) 31.

Several years prior to their location of the mining claim in controversy, plaintiffs having located the same claim, and placed stakes, with mounds of rock, at each corner of the surface ground, and at the centers of the end lines, their adoption of these stakes in making a second location was a sufficient compliance with Rev. St. U. S. §2324, requiring that the location of a claim be distinctly marked on the ground, so that its boundaries can be readily traced. Conway et al. vs. Hart, 62 Pac. Rep. (Cal.) 44.

One of the plaintiffs, after conversation with the defendant about the boundary line between the claims in question, without the knowledge of his co-tenant put three stakes across plaintiffs' location, a considerable distance north of the line claimed by plaintiffs in their suit as their south line, but the line thus indicated was afterwards repudiated by both plaintiffs and defendant. Held, that plaintiffs were not estopped from claiming any ground south of the line so indicated. Conway et al. vs. Hart, 62 Pac. Rep. (Cal.) 44.

Evidence that, prior to the location of the tiffs' claim the land was unoccupied by anybody, and was vacant government land; that before their second location plaintiffs worked the claim for several years, placed stakes around it, sunk a shaft, and took out rock; and that when they made the second location they found the stakes, shaft and claim in substantially the same condition as when they left it, is sufficient to show that the land was vacant public land when the second location was made, as against a subsequent locator asserting no title antedating his location. Conway et al. vs. Hart, 62 Pac. Rep. (Cal.) 44.

Evidence that, prior to the location of the claim in question, plaintiffs had sunk a shaft twenty-five to thirty feet, and had taken from it a considerable amount of quartz rock, which formed a dump, and that rich rock was found, and that in surveying the claim the surveyor measured along the lode line, taking his directions for the course of the vein from a line drawn from the shaft through two or three prospect holes where the ledge was exposed, together with the admission of the contesting claimant that the rock taken out was gold-bearing, is sufficient to show that a gold-bearing lode or vein had been discovered by plaintiffs within their claim at the time the location was made. Conway et al. vs. Hart, 62 Pac. Rep. (Cal.) 44.

Plaintiffs made a contract to sell certain properties, called the Conway and Zimmerman mining claims, for a sum named, which was to be paid upon a day fixed therein. At the same time they made and delivered a deed conveying said claims to the parties named in the contract, and the latter made a reconveyance to plaintiffs, which was placed in escrow, to be delivered to plaintiffs upon the failure of grantors to comply with their part of the contract. Held, that the three instruments, forming parts of one transaction, constituted a mere contract to convey, and failed to show lack of title in plaintiffs, preventing them from maintaining an action to enjoin interference with their claim, known as the Belmont mine, conceding that such claim was included in the conveyance referred to. Conway et al. vs. Hart, 62 Pac. Rep. (Cal.) 44.

TRADE NEWS.

Louis Falkenau of the State Assay Office, formerly at 434 California St., San Francisco, Cal., has moved to much larger and better appointed quarters at 538 Sacramento St., just below Montgomery St.

Fairbanks, Morse & Co. of Chicago have just issued their catalogue No. 47, describing their pumping engines operated on gasoline, gas or distillate. By virtue of their long experience in the manufacture of both gasoline engines and hydraulic machinery, Fairbanks, Morse & Co. are able to produce combinations possessing unusual advantages in the line of pumping engines. As they state in the introduction to their pamphlet, the usefulness of a first-class gasoline engine may easily be lost if the pumping portion of the machinery is badly designed, and likewise the usefulness of a good pump may be lost if the engine is not proportionate and adapted to the pump. Upon being advised of conditions, the company is able to design and furnish plants that will fill all requirements in a most satisfactory manner. Fairbanks-Morse gasoline pumping engines are at present in use by the Arizona Copper Co. of Clifton, Ariz., the Wellston Coal Co. of Wellston, O., the Paducah Coal & Mining Co. of Sturgis, Ky., the Wapello Coal Co. of Hiteman, Iowa, and by other prominent mining companies. The catalogue in question contains considerable valuable information which should be at hand when engineers or managers of mining plants are trying to determine the type of engine suited to their purposes. The book is sent free on request.

A new device for unloading vessels has been designed by the California Wire Works of San Francisco. It is at present in use on an old monitor that is doing duty as a coal barge in San Francisco Bay. It consists of a 2,240-pound capacity grab bucket, operated over a movable trolley running on a track cable supported by structures erected at each end of the barge. The power used consists of a triple-drum link-motion double-cylinder ten by twelve inches. The trolley is moved fore and aft on the track rope by means of a grooved drum on the hoisting engine, the rope being endless. The closing rope and hoisting rope running from the grab bucket pass over sheaves in the lower part of the trolley, thence to the head sheaves in the supporting tower, and thence to their respective drums on the hoisting engine. One man operating this engine is able to discharge two loads a minute into the hopper in the center of the boat, over which the bucket passes. The coal is then conducted by a chute to a coal tub on either port or starboard side resting on a square platform, where it is automatically weighed and is then hoisted to the top of the side frame and automatically dumped into a chute which extends over the side of the vessel being loaded. It can deliver coal into vessels at varying heights, the maximum difference in deck levels being thirty feet. This coal tub is operated by an auxiliary engine amidship.

Construction and Development News.

It is reported that Baker City, Ore., is to have a new railroad and smelter.

A new smelter is to be erected at the International copper mines, Dorchester, Neb.

The construction of another smelting plant at Northport, Wash., is in contemplation.

Northport, Wash., will probably have another shipper soon in the Galena Queen mine.

For the present, the Frisco mine of Joplin, Mo., has closed down. The company may put in a mill.

The Virginia Coal, Coke & Iron Co. of Bristol, Va., has purchased 3,000 acres of mineral land in Lee county, Va.

The company running the Nightingale claim at Cripple Creek, Colo., has planned extensive development work.

The five claims owned by the Rosalind Gold Mining Co. at Eldora, Colo., are being developed by that company.

John W. McCulloch of Owensboro, Ky., is president of the Owensboro-Joplin Mining Co., recently reported as chartered.

The Coal Hill Co. of Omaha, Neb., has taken control of the Burlington Block Coal Co., operating at Unionville, Mo.

Drummond, McNeary & Co., on the Kittie mine of Anaconda, Colo., are rapidly preparing to ship 100 tons of ore a week.

The Star mine of Gunnison, Colo., is to have a new hoisting plant, and haste will be made to get it ready for winter use.

The Belew Mining Co. of St. Louis, Mo., has been incorporated with capital stock of $15,000, by Gabriel C. McDonald and others.

The Clearjack Mining Co. has been incorporated by William B. Young, Frank O. Chesney and Benjamin F. Young, all of Kansas City, Mo.

Plans for the construction of a Bessemer plant at Waukegan, Ill., are under consideration by the American Steel & Wire Co. of New York.

The Knoxville Foundry & Machine Co. of Knoxville, Tenn., has obtained a permit for the erection of a $1,000 addition to its foundry buildings.

The Amarillo Grain & Coal Co., Amarillo, Tex., has been incorporated with capital stock of $5,000 by Robert Smith, S. J. Brown, and J. W. Veale.

It is stated upon good authority that the Canadian Pacific smelter at Trail, B. C., is to be enlarged at once to more than double its present capacity.

E. W. Sebbin has placed on record fifteen deeds from the lot holders in the town of Anaconda, Colo., giving him the right to mine under his property.

W. A. Maxwell is sinking a shaft at Coos City, near Marshfield, Ore. It is now down ninety feet and near coal. Development will proceed regularly.

The Texas Coal & Mining Co. of Austin, Tex., has been incorporated with capital stock of $30,000 by William H. Stacy, George A. Brush and J. M. Thornton.

The 500-foot level of the Mary Cashen mine at Cripple Creek, Colo., is following several fine stringers of ore that may at any time lead to a big ore chute.

The Doctor Mining Co. of Joplin, Mo., has been incorporated by D. C. Doane, N. H. Doane and others of Joplin, and W. M. Jollings and J. E. McCrew of Omaha, Neb.

A. B. Fleming and associates of Fairmont, W. Va., have incorporated the Fairmont Coal Mining Co. with capital stock of $1,000,000, to open coal mines near Fairmont.

Scott, Campbell & Renshaw, leasing on the Little Pearl at Cripple Creek, Colo., have opened the ore chute on that property and expect to commence shipments immediately.

The Charleston Iron Works of Charleston, S. C., have been incorporated with capital stock of $5,000. The officers are John F. Rafferty, J. J. Madden and George A. Franklin.

A force of men has been put to work on the Shiloh & Royal claims, Northport, Wash., crosscutting the lead, sinking on the ore shoot and preparing for extensive development.

Campbell & Young, who recently secured a lease on Block 6, of the Vindicator at Cripple Creek, Colo., are actively developing the property, and at the same time saving a little ore.

The Commonwealth Gold Mining Co. at Cripple Creek, Colo., has purchased for $9,000 the claim adjoining the Rigi group on Battle Mountain, Colo. The claim consists of 2,060 acres.

The Charleston Iron Works of Charleston, S. C., have recently been incorporated. John F. Rafferty is president, J. J. Maddin is vice-president, and George A. Franklin is secretary and treasurer.

Lessee Harcourt on Block 3 of the Little Nell, Cripple Creek, Colo., has encountered a phonolite dyke in the shaft at a depth of eighty-three feet. It is heavily mineralized and looks promising.

The Gruson Iron Works are said to have let a contract for the erection of a new plant at Eddystone, Pa., for the manufacture of chilled iron armor, Gruson turrets, gun carriages and other war material.

It is reported from Seattle, Wash., that a 100-ton mill is likely to be established at the mines of the Wauconda Gold Mining Co. by officials of the Rossman Reduction Co., of Minneapolis and St. Paul, Minn.

The Coal Creek Coal Co. of Raven, Va., has organized with R. R. Henry of Tazewell, Va., as president, and G. W. Gillespie of Tazewell as secretary and treasurer. The company is opening mines near Raven.

W. S. Stratton has purchased from Carl Johnson the Ouray and the Nada claims, situated near Cripple Creek, Colo. The claims contain a little over three acres and were paid for at the rate of over $10,000 an acre.

A mill is to be built in Denver, Colo., to treat molybdenum ore from a mine lately discovered at Las Vegas, N. M. State Commissioner Lee of Denver, is understood to have further information as to the project.

H. W. Reed, manager of the Revenue, at Fairplay, Park county, Colo., has recently taken a bond and lease on the Old Maid property which adjoins the Bachelor, and on which he proposes to run a tunnel to the railroad tracks.

Dr. R. C. Weldon of Halifax, N. S., who has been inspecting the Tete Jaune Cache mica mine at Vancouver, B. C., says that he is well pleased with the prospects of the mine, and intends to hasten development on an extensive scale.

The Wheeling Steam Coal Co. of Wheeling, W. Va., has been incorporated with capital stock of $25,000, by Johnson C. McKinley, William N. Phillips, and Nehemiah A. Harring of Wheeling, and Charles B. Alexander of Parkersburg, for coal mining purposes.

The wagon road to the site of the new Gold Run Mining and Milling Co.'s tunnel at Breckenridge, Colo., has been completed. Work has been started on the open cut leading to the mouth of the tunnel, and contracts for the mine timbers are being let.

The Universal Fuel Co. of Chicago has been testing the coal from the mines of the St. Louis & Big Muddy Coal Co. of Cartersville, Williams county, Ill., to ascertain its coking qualities, and the results are satisfactory. Capt. Samuel T. Brush is general manager.

The south drift on the vein at the Knob Hill mine, Republic, Wash., is in good milling quartz from four to five feet in width. A new tunnel has been started at the south end of the hill to crosscut the vein at a greater depth than the one which enters the hill from the west side.

The shaft of the new mine of the Chicago, Wilmington & Vermillion Coal Co., near Virden, Ill., is now down to the coal. The vein was found at a depth of 305 feet, and is seven and one-half feet thick. The company expects to commence shipping coal within the next few weeks.

Fayerweather & Ladew of 159 E. Houston St., New York City, are making preliminary examinations and developments of a three-foot vein of coal at Mt. Savage, Md., and expect if coal is found in sufficient quantities, either to open the property or to lease it to parties who will work it.

The St. Paul Coal Co., recently incorporated at Ottumwa, Ia., by Glenn W. Traer, James B. Corrigan, and J. S. Blee, with capital of $300,000, has organized with Glenn W. Traer of Chicago as president. The principal office will be in Ottumwa. The company has a large acreage of coal land.

The Chisholm Iron Co. has bottomed two more pits in ore on its explorations near Hibbing, Minn. Assays show a sixty-five per cent ore low in phosphorus. Articles of incorporation have been filed. The incorporators are A. M. Chisholm of Hibbing, John R. Mitchell of Winona, and M. L. Fay of Virginia.

A deal has lately been closed whereby the Star group of claims, on Italian mountain, owned by Charles Hubbard and others, was sold to Henry Gillespie of Aspen, Pitkin Co., Colo. The Star mine, the principal one of the group, is a high grade proposition and has a fifteen-foot vein of ore. The new company has commenced to place a machinery plant upon the property and will also erect a saw mill.

A contract has been entered into between the Coriianus Gold Mining Co. and the United States Transportation Co., both of Cripple Creek, Colo., whereby the latter gets a perpetual right of way through the former's territory. For the right of way the latter company will allow the Coriolanus company the right to use its tunnel. When the tunnel is completed, the United company will equip it with an electric railway to carry ore from the Wild Horse and the Damon mines to the Economic mill in Eclipse gulch.

The American Iron & Steel Association in its last bulletin recorded the erection of four new furnaces: Two at South Chicago, by the Illinois Steel Co., one at Thomas, Ala., by the Pioneer Mining & Mfg. Co., and one at La Follette, Tenn., by the La Follette Coal, Iron & Railway Co. In addition to the above the Carnegie Steel Co. is building two large furnaces at Rankin Station; the Buffalo Charcoal Iron Co. have about completed a charcoal furnace at Buffalo, N. Y.; Joseph Wharton is building a new furnace at Port Oram, N. J.; the Warwick Iron & Steel Co. is building a new furnace at Pottstown, Pa.; the American Steel & Wire Co. is building a new furnace at Neville Island, near Pittsburgh, Pa., and is erecting an additional stack at their Central furnaces, at Cleveland, Ohio; Jones & Laughlins, Ltd., are adding a new furnace to their Eliza plant at Pittsburgh; the National Steel Co. is erecting three new furnaces, one at New Castle, Pa., one at Mingo Junction, Ohio, and one at Youngstown, Ohio, and is also building another stock at Mingo Junction to replace one of their old furnaces now in use; the Sharon Steel Co. is erecting a new furnace at Sharon, Pa.; the Roane Iron Co. is erecting a new furnace at Rockwood, Tenn.; the Columbus Iron & Steel Co. has about completed the erection of two furnaces at Columbus, Ohio; the Globe Iron Co. is erecting a new furnace at Jackson, Ohio; the Iroquois Iron Co. is erecting a new furnace at Chicago, Ill., and the Colorado Fuel & Iron Co. is erecting a new furnace at Pueblo, Colo.

New Mining Applications.

Applications for patents of mining claims have recently been entered in United States land offices as follows:

Wm. O. Parker, Bridgeport, Mono county, Cal.; Ruby placer and Ethel placer claims, Green Creek district, Mono county, Cal.

Anton Nelson, Fairplay, Colo.: Dyer and Edgemere placers, Leadville, Park county, Colo.

A. M. Maclean, Alma, Colo.: Mabel, Lancashire Boy, Little Nola, Free Coinage, Gertie N. and Dictator lodes, Mosquito district, Park county, Colo.

Empress Josephine Mining Co., through its attorney, John E. Ashley, Villa Grove, Colo.: Bonepart lode, Saguache county, Colo.

San Isabel Mining Co., Crestone, Saguache county, Colo.: Virginia lode, Saguache county, Colo.

John M. Kuhn and Christian F. Horn, Alma, Colo.: Boston and New York placers, Buckskin district, Park county, Colo.

Wm. P. Sale, Boulder, Colo.: New Year, Thanksgiving and Half Circle lodes, Magnolia district, Boulder county, Colo.

L. R. Evans, Jamestown, Colo.: Bondholder lode, Central district, Boulder county, Colo.

J. Irving Weed, J. L. Bickford, John Winkler, and I. Van Keuren, Sunshine, Colo.: Glad Eye lode, Gold Hill district, Boulder county, Colo.

W. L. Beach, Wallstreet, Colo.: K. P. lode, Sugar loaf district, Boulder county, Colo.

Edwin Williams, Boulder, Colo.: Golden Harp lode, Gold Hill district, Boulder county, Colo.

Samuel Heilner and E. R. Booth, Philadelphia, Pa.; Marchioness Tunnel, Nos. 1 and 2, Magnolia and Sugar Loaf districts, Boulder county, Colo.

Leonard Cheney, Milwaukee, Wis.: Bug Nos. 1, 2, 3, 4 and 5 claims, Lake county, Colo.

John C. Miller, Leadville, Colo.: Golden and Cord lodes, Lake county, Colo.

John Hodson, Salt Lake City, Utah: Bunker Hill lode, Salt Lake county, Utah.

Edward G. Stolber, Silverton, Colo.: Animas district, San Juan county, Colo.

Fred D. Willoughby, by his attorney, W. R. Mitchell, Howardsville, Colo.: Animas district, San Juan county, Colo.

John C. McKeon, by his attorney, J. H. Singleton, Alma, Colo.: White Metal, Free Coinage and Double Standard lodes, Pollock district, Summit county, Colo.

Fred Roberts, by his attorney, Charles Campbell, Breckenridge, Colo.; Consolidation mine, Union district, Summit county, Colo.

Sarah Crowley, Como, Colo.: Gold Chief lode, McBarnes district, Summit county, Colo.

PERSONAL.

Marcus Daly of Montana is ill in New York City. He has just returned from Europe.

W. J. Nicholson has returned to Visalia, Cal., after an absence of several months at Cape Nome.

John Horton has returned to El Paso, Tex., from a trip to the San Andreas mining district, in Mexico.

E. H. Cook, superintendent of the United Globe mines, of Phoenix, Ariz., was recently in San Francisco, Cal.

Mrs. E. C. Atwood, treasurer of the International Mining Congress, has been in the East on a business trip.

John Henry of El Paso, Tex., has returned to that city from Salson, Ida., where he was engaged in mining.

L. E. Aubury, the mining engineer of Los Angeles, is spending a few weeks in the northern part of California.

Charles H. Cobb of Boston, Mass., a director in the Sunnyside mine in Boulder county, Colo., has recently visited the mine.

W. D. O'Brien, superintendent of the C. & C. mine in Jackson county, Ore., has returned from his visit to San Francisco, Cal.

Henry Gillespie of Denver, Colo., formerly of Aspen, has purchased the Star group of mining claims on Italian Mountain, Colo.

C. L. Hoffman of Spokane, Wash., has returned to that place after investigating the proposed government railroad between Port Valdes and the Yukon river.

Colonel S. W. Ray of Port Arthur, Ont., a banker and president of the company controlling the Mollie Gibson mine, has been at Nelson on business connected with the property.

W. E. Corey, superintendent of the Homestead Steel Works of the Carnegie Steel Co., accompanied by a party of Carnegie officials, has gone on a visit to the Lake Superior ore mines.

E. C. Hammill, who has been for two years operating quartz ledges in Benget, near Manila, in Luzon, has arrived in California, bringing with him a pretty collection of samples from the Philippines.

A. M. Esler of Helena, Mont., who built the first smelter in that place, and who has been prominently connected with the mineral development of Montana and Idaho, died suddenly on Sept. 11 at Atlyn.

William O'Brien, who has for several years been a shift boss, on the Ibex mine at Leadville, Colo., sailed for London in August. From there he will go to South Africa to take a position on the Simmer and Jack mine.

W. F. Drouillard of Randsburg, Cal., a young man not yet twenty, has secured a position with the Cedros Island Mining Co. as mill man. The company's property is located upon the Cedros Island, off the coast of Lower California, Mex.

CORRESPONDENCE

ARIZONA.

(From Our Special Correspondent.)

Tucson, Ariz., Sept. 17, 1900.

Tucson, aside from being the third oldest city in the United States, has always been and is now the center of a vast and wealthy mineral section of the territory of Arizona. There are within a radius of sixty miles more than a score of well-established and thrifty mining camps, whose base of supplies is Tucson, with daily stage and mail connections.

At Mammoth, fifty-two miles north of here, on the San Pedro river, where the writer visited recently, the Mammoth-Collins Mines, Ltd., are located and have been in operation for the past twelve years. The mills, cyanide works (a 500-ton plant which has been closed down for want of tailings the past two months, but will start up on December 1) and office are at Mammoth, but the mines are three miles west of Shultz, whence the ore is transported by tramway.

Geo. P. Blair is general manager and F. Lester superintendent. Mr. Lester, who was formerly from Idaho, has had many years of experience, mostly in mines with plenty of water, and now that they have found water at the Mammoth, eighty feet from the surface, he is familiar with the method of handling it. They employ about sixty men at the mine and mill, and are running full time.

At the Helvetia camp, thirty-two miles south of Tucson, everything is moving along as usual. The only drawback there at present is the lack of water. The company has a plan for developing a larger supply on which they are now working.

Immense deposits of copper ore, laying dormant within a score of miles of Tucson, are slowly being brought to the front. As soon as railroads are built crosswise and in different directions from the transcontinental lines now traversing the territory, developing will be undertaken on a larger scale.

Complaint is made by long-established and well-known mining men who have been located here for years that fake "experts" without means, standing or experience have recently come here to work off worthless mining properties on what they call "Eastern suckers" who come for investment. By so doing they not only do an injury to the territory and the good mines, but damage the reputation of reliable mining men well known here, such as O. T. Richey, Frank M. King, Charles von Erxleben, Charles E. Udall and Alexander McKay, all of whom have esablished reputations and are prominently identified with this section of Arizona.

It is interesting to note the number of old 49'er miners of California who are found scattered around the mining camps and towns of Arizona. They all have their tale of good or bad luck, and are living pages of the mining history on the coast.

GEO. E. PLACE.

CALIFORNIA.

(From Our Special Correspondent.)

The Brown Bear, a gold property at Deadwood, Trinity county, owned by the Brown Bear Mining Co., of which Charles Dobler is manager and superintendent, has eighty-five men employed in and about the property. The equipment upon this property is being removed to the mouth of the Watt or lower tunnel, and will be completed about November 1. Fifteen stamps and three concentrators run by steam power will soon be treating the ore.

This is a well developed property having some twelve miles of tunnels, drifts and crosscuts. The longest tunnel on the property is about 5,400 feet, while the depth of the main shaft is 384 feet.

Electricity is used to run twenty stamps and eight concentrators at the Texas mines, a group of thirteen claims bonded and leased by C. C. Bush, Jr., and H. C. Woodrow at Hart, Shasta county. Twenty-five men are employed at these mines. Work on the 300-foot shaft and 1,400-foot tunnel is progressing steadily. The lowest tunnel is to be extended to 1,500 feet and a new shaft sunk. In the near future twenty additional stamps are to be erected, together with a cyanide plant. H. C. Woodrow is superintendent and manager.

The Iron Mountain, Stowell and Balakala copper properties owned by the Mountain Copper Co. at Keswick, Shasta county, are showing up in good shape. Lewis T. Wright is general manager and H. W. Edwards is assistant general manager of the property. About 1,300 men are employed at the mines and smelting furnaces. There are twenty-two of the latter at present in operation. It is the intention of the company to add more furnaces and a new plant for utilization of low-grade ores.

At Amador City, in Amador county, John R. Tregloan is the owner and manager of the Excelsior Gold Mine, a new property that is to be thoroughly equipped and opened. It adjoins the Bunker Hill property on the east. Ten men are employed in the 80-foot shaft.

Ninety men are employed on the Royal Group of gold mines at Hodson, Calaveras county, owned by the Royal Consolidated Mines Co. J. C. Kemp Van El is the superintendent of this property. A depth of 950 feet has been attained in the main shaft. Steam is used to run the forty stamps and twelve concentrators, while forty more stamps of a contemplated 120-stamp mill are now being installed.

An electric power plant is to be erected on the Gold Bug mine at Georgetown, El Dorado county, to take the place of the water power at present being used. The Gold Bug Mining Co. is the owner of these mines and W. E. Thorne is manager and superintendent. The property is both quartz and placer and produces gold and silver. Fifteen men are employed.

Extensive development work is to be instituted by the Eagle Bird Mining Co., which owns the Eagle Bird mine at Maybert, Nevada county. Twenty-five men are employed, under the superintendency of W. M. Wilson. The length of the main tunnel in this property is 1,200 feet, while the depth of the main shaft is 800 feet. Water power is used to run a thirty-stamp mill and four concentrators. This is another of the many gold properties in Northern California.

A. R. DUNBAR.

MICHIGAN.

(From Our Special Correspondent.)

Houghton, Mich., September 19, 1900.

The valuation of Houghton county as reported by the assessing officers of the State Board of Tax Commissioners has been raised $39,491,521, making the total valuation $122,491,521. Of the increase the Calumet & Hecla furnished $21,717,450. Other large increases were: Atlantic, $249,000; Arcadian, $200,000; Baltic, $706,000; Champion, $260,000; Centennial, $747,000; Elm River, $179,050; Franklin, $300,000; Isle Royale, $1,650,000; Osceola, $2,360,035; Old Colony, $150,000; Quincy, $5,120,926; Tamarack, $3,844,970; Trimountain, $417,000; Wolverine, $788,500; Winona, $371,650; Wyandot, $165,500.

The land holdings of the St. Mary's Mineral Land Co. were increased $25,600, and the Tamarack-Osceola Copper Mfg. Co. showed an increase of $25,000.

Of the total increase $31,773,521 was on real estate and $7,718,000 on personal estate of the twenty-three mines, thus including every active mining property in the country. Included in the personal estate increases was an item of $4,000,000 cash held by the Calumet & Hecla in Boston banks. Taxes on this money are now paid in the state of Massachusetts.

Despite the heavy rains, the crew working on the reconstruction of the Mineral Range Railroad trestle over the Quincy and Torch Lake Railway are making good progress. The trestle was partly demolished by a runaway rock train on the 13th.

Ground will soon be broken for the sixth shaft on the Osceola lode by the Calumet and Hecla. The Calumet is developing a big mine on the amygdaloid, and by the time the new mill is completed will have spent nearly $2,000,000 upon it.

It is stated that a shipment of thirty tons of copper ore from the Sudbury district, Algoma, Canada, was made in July to Dollar Bay. The smelter returns of the shipment are $1,800 or $60 per ton. The ore was principally a chalcopyrite and ran nearly twenty per cent in ingot copper.

MISSOURI.

(From Our Special Correspondent.)

Joplin, Mo., September 24, 1900.

The zinc ore market last week manifested unmistakable signs of increased activity. The top price for zinc ore was $27.50 a ton in the bin and this was paid for several consignments of high grade Joplin and Neck City ore. Elsewhere in the Missouri-Kansas district, the prevailing prices were $26 to $27 a ton for a high grade product. There was no change in the lead situation, ore continuing to sell at $23 per thousand pounds delivered, as in former weeks.

The week's output of zinc ore showed a falling off of thirty-two carloads from the record of the preceding week, and an increase of nine carloads over the corresponding week of 1899. Of lead, the output was an increase of four carloads over the preceding week and of five carloads over the record for the corresponding week of last year. District sales were as follows:

	Zinc.	Lead.	Value.
Last week.....	8,639,130	1,285,290	$129,181
Week last year...	8,263,830	1,065,200	180,899
Since Jan. 1.....354,783,480		41,780,110	5,965,792

GENERAL NEWS

ALASKA.

Edward Hibard tells of an old mine which was worked long ago being found again. The mine is a copper one, and situated near Mount St. Elias.

The City of Topeka, on her last trip to Alaska, took the material for a wire tramway at the Copper mountains, together with a force of men to do the construction work. Work will be commenced at once and ores will be shipped as soon as the tramway is completed. The Copper mountain is considered one of the most promising mines in the district, and its successful development is sure to be followed by the opening of others in the neighborhood.

Development work is in active progress on the Mackenzie group of claims at Skowl Arm, Prince of Wales Island, under the auspices of an Eastern syndicate to whom they were recently bonded. The ores of this group carry a high percentage of copper, four per cent nickel, and some gold.

ARIZONA.

Work is being rapidly carried on for the completion of the Phoenix mine at Phoenix. The ground is cleared off ready for the plant, and in a short time the company will be able to treat 125 tons of ore daily.

An account of a strike made in the property of the Dos Cabezas Consolidated Mining Co. was published about a month ago. Since then the ore body has been rapidly increasing and assays show it to be twenty-five per cent copper, carrying $350 in silver and $25 a ton in gold.

ARKANSAS.

The Independent Smelter Co. of Webb City, Ark., has opened an office in the Clark Dodson building, opposite the Newland hotel.

The Phoenix Zinc Mines Co. is one of the latest candidates for public favor. Its location is in Marion county, a section conceded to be rich in zinc ore. The ore now mined is of a high grade. For the present the White river helps to solve the question of cheap transportation, and railroads are also being built in the section.

CALIFORNIA.

Russell & Maker, in the tunnel of the Great Western mine, near the Yellow Rose, at Redding, Shasta county, have uncovered an eight-inch seam of talc carrying free gold to the value of from $200 to $300 to the ton.

Stephen R. Thorne has sold to the Green Consolidated Gold Mining Co. the Mount Vernon mine at Sugar Pine, Tuolumne county, for $38,000. This is an old mine, having been worked in 1877 by Josiah Hall, and was considered a valuable property.

San Francisco parties have secured the bond on the Benvenuta, formerly the Virginia, in Mariposa county. The purchase price is to be $150,000.

The owners of the Black Oak mine at Soulsbyville have incorporated a company to work the property. W. P. and W. G. Scott, C. S. Dowe and G. W. Campbell were the incorporators.

Prof. F. M. Anderson is now examining the mines of the Coffee Creek district of Shasta county, and appears to be favorably impressed with what he has found there. He was accompanied in his visits to the mines by H. S. Osborne of Los Angeles, Cal., who is also interested in the section.

D. A. Lumsden has struck it rich in the Jaw Bone district, near Groveland, Tuolumne county. He has an eighteen-inch ledge of ore assaying $70 to the ton. He is working the ore in an arrastra.

The Nameless mine in Mariposa county, on the Merced river, four miles from Coulterville, has a force of men grading for a twenty-stamp mill.

Two three-and-a-half-foot Huntington mills, several water wheels, a rock breaker and considerable other machinery is being placed on the Mocho-Java mine, near Redding, Shasta county.

Capt. A. H. Ward, of San Francisco, is preparing to resume work on the Pino Blanco property, on the line of Mariposa and Tuolumne counties.

The Producers' Oil Storage and Transportation Co., recently organized at Bakersfield, seems likely to develop into a power in the oil industry of California. The articles of incorporation provide for the following directorate: C. A. Canfield, Los Angeles; H. A. Blodgett, Bakersfield; Burton Green, Los Angeles; W. H. McKenzie, Fresno; M. J. Laymance, Oakland; Othelo Scribner, Visalia; B. F. Brooks, Bakersfield; Henry Ach, San Francisco; E. L. Doheny, Los Angeles; H. H. Blood, Bakersfield. The capitalization is $1,000,000, the par value of the shares being $1.

In our issue of September 1, in commenting upon the rates charged by the Needles smelter, we stated with reference to the amount of sulphur allowed in copper ores that "twenty-five per cent per unit" will be charged, instead of "twenty-five cents per unit," as is the case.

At present only twenty miners are employed at the Shawmut mine in Tuolumne county, and the force will not be increased until sufficient water is at hand to start the mill. In the meantime the company is having some important work done to guard against delays, which are frequently occasioned by the breaking of ditches during the winter months. At an elevated point two miles east of the mine a substantial storage reservoir is being built which will be connected with the works by a thirty-inch pipe line.

Two hundred feet more in depth will be sunk on the shaft of the Ford mine, near San Andreas, Calaveras county, for the purpose of thoroughly testing the property.

The Green-Jumper mines near Sugar Pine, Tuolumne county, are running full blast, the new machinery having been placed in position.

Work is to commence on the tramway from the hill below Tods Valley to the Cash Rock on the middle fork of the American River in El Dorado county. The Cash Rock Co. intends to put in machinery to drill through the gravel beds in order to prospect their claim.

About three feet a day is added to the depth of the Larkin mine shaft near Placerville, El Dorado county, which is now 695 feet deep.

Work at the Lloyd mine on Central Hill, Calaveras county, has been steadily prosecuted, and the shaft is now down to a depth of 160 feet. A Cornish pump is to be put in to handle the water recently encountered.

The Dead Horse mill at Carters, Tuolumne county, was compelled to hang up its stamps on account of the lack of water for power purposes. Work in the mine is progressing as usual. Many other mines, particularly on the Mother Lode, have had their water supply cut off, and those not equipped with steam will have to wait for the winter rains before resuming operations.

Rich ore was uncovered at the Sunnyside mine in Tuolumne county, and is being vigorously opened up.

It is said the Melones Mining Co. at Robinson's Ferry has enough ore in sight to keep a 120-stamp mill going for fourteen years.

The Chucawalla district in the Eastern part of Riverside county is steadily coming to the front, and many mines are being located and developed. Albert Johnson and Paul Snyder, who are interested in that section, have recently discovered a good piece of property in the Golden Rule mine.

C. N. Robertson and C. N. Deihl have recently located the Minnesota mine in the Minnesota district of Riverside county, and believe they have an excellent piece of property in their new location.

COLORADO.

The R. A. M. mine at Leadville caught fire early in September. It is the deepest mine in the district. The probable loss will be about $40,000.

A high grade carbonate ore has been found on the 250-foot level of the Debbin shaft, which is about half a mile south of the R. A. M. mine.

The articles of incorporation of the Leadville Mining Stock Brokers' Association have recently been filed with the secretary of state. The object of the association is to facilitate the easy transaction of business in dealing in mining stocks; to regulate commissions, regulate and make general quotations which are to be based on the lowest responsible selling price; to stimulate the market for desirable stocks and guard the dealing public against fake schemes and worthless stocks.

A plant of machinery consisting of a 40-HP. hoisting engine and boiler has been installed at the Smuggler mine, Silver Plume, by Mr. Catren.

Plans are under way for the rebuilding of all the smelting and condensing apparatus at the Union smelter at Leadville, comprising furnaces, flues and crushers. The old furnace will be torn out and replaced by new ones of double the size of those now in use.

At the Arkansas Valley smelter at Leadville large condensing chambers are being constructed and a smoke stack is being built.

It is thought that the Seely shaft at Leadville is developing in a way that will greatly encourage those who anticipate opening property in the vicinity. At a depth of 400 feet, where the shaft first struck the contact, a vein of iron was reached, and the operators are expecting to find ore at any time.

A serious cave-in occurred in the Bassick mine at Querida, in the Silver Cliff district, near Florence, which will stop the work there for a while. The shaft is 1,200 feet deep, but the cave-in is on the 500-foot level, where the timbering gave way. Although there were several men at work at the time, only one was hurt.

Efforts are being made to make the La Plata district a profitable one by aid of the cyanide treatment of low-grade gold ores. The high-grade ores will continue to go to the smelters.

The A. M. W. Mining Co. has at last succeeded in accomplishing the task of unwatering, enlarging and retimbering the old Wolftone shaft at Boulder.

The Maple Street shaft at Boulder is now down 200 feet and a quantity of water, too great to be baled out, has been encountered.

There is a scarcity of miners at Georgetown. Many more could be employed if they were available.

A steam hoist is being put up on the Smuggler group, which will enable the owners to sink an additional 1,000 feet.

The Capitol Hill Mining Co. of Leadville started up work in its shaft on Capitol Hill early in September.

Another large shipment of zinc has been sent from Leadville to New Orleans. It consists of 4,000 tons, and was bought by Jacobson & Co. of New York.

The Mab, as a separate mining concern, is now out of existence, and has been merged into the A. M. W.

The operations at Silver Moon are progressing, and the manager expects shipments will be made before the winter season.

The Winners Mining & Leasing Co. has cut a vein in the 550-foot level of the mine. The vein is the same as opened in all the levels above where the vein has an average width of five feet, and at times has been exceedingly rich.

Frank Maynard, leasing on the Fauntleroy, received a return of 1.20 ounces of gold on his last shipment of twelve tons.

At a meeting of the stockholders of the Six Points Gold Mining Co. held September 6, the sale of the Six Points claim to Francis Hawley, as trustee, for $120,000, was ratified, and immediately afterward the directors declared a twelve-cent dividend, amounting to $120,000.

A carload of ore has been sent out from the Jeff Davis, at Colorado Springs, and will average not less than three ounces to the ton. The ore comes from a rich vein at the seventy-five-foot level.

A large amount of water has been encountered at the 850-foot level of the Morning Glory claim, Colorado Springs, interrupting the sinking of the shaft.

It is understood that the Starkville coal mine at Trinidad is putting out great amounts of coal. It is one of the best coal mines west of Pennsylvania.

A strike of more than ordinary importance is reported from the Bare Hills district, of Park county. The strike was made in the Mayflower mine, and consists of rich tellurides carrying sylvanite.

The Strong mine at Cripple Creek has completed a shipment of 100 tons of smelting ore. This is the first shipment since the resumption of work, for the property has been closed for some time, during which a new and much larger shaft house has been built and a large plant of machinery installed.

The conditions at the Seeley shaft of the Poverty Flat Mining Co. are very satisfactory. Drifting has commenced on a fair looking contact, and the indications are that a body of ore will soon be encountered.

The work of increasing the capacity of the Boston Gold-Copper smelting plant progresses rapidly. The superintendent expects to have one of the furnaces going soon.

The main shaft of the Lucky Guess mine is down to a depth of 987 feet, and timbering preparatory to cutting the station at 975 feet is now in progress. From that point levels will be run to cut the ore chutes, and it is expected that shipments will soon be made.

The vein at the 100-foot level of the White lease, on the Trachyte, is four feet in width, and giving values from seven to ten ounces of gold to the ton.

IDAHO.

The Standard Mining Co. of Wallace is putting in a new air compressor and electric plant. The foundation is completed and some of the machinery is on the ground.

The company at Hailey, owning the Golden Star mine, is building a substantial ten-stamp mill, a two-story office building, a boarding house, bunk house and other necessary buildings.

Rich gold specimens from the 200-foot shaft of the Big Buffalo continue to cause favorable comment among the residents of that vicinity.

A remarkable gold strike has been made at Silver City. The strike was made in the center of the city, near the War Eagle hotel, by a prospector. The ore is a quartz that will go over $3 a pound.

The development of the Boston & Seven Devils Copper Co.'s property is progressing satisfactorily. A shaft is being sunk on the Peacock with ore all the way.

At the Blue Jacket ground is being graded for new and heavy machinery.

MINNESOTA.

The great rain storm at McKinley early in September caused great damage to the mines and railroads. The Fayal mine was flooded for the third time in six weeks, which will reduce the season's output by many thousand tons.

MISSOURI.

A unique display will be made at the St. Louis exposition this fall by enterprising owners of productive lead and zinc mines in Jasper county. Their plan is to build a mammoth cave with the ore specimens, have it lighted with electricity and made in every way as attractive as possible. Each specimen will bear a label, on which will be given the name of the mine whence it was taken and all the incidental information likely to be wanted by the thousands of visitors who will find such an exhibit of special interest and value.

MONTANA.

The Colusa-Parrot is turning out more ore than ever, and the other Clark properties are keeping up their record. It has been necessary to increase the smelting capacity of the Butte Reduction works.

John O'Brien and partners of Marysville are building a new mill on Poorman Gulch, near the mouth of the canyon.

The development of the Stoney Creek property, in Madison county, is being pushed. The shaft is now down 170 feet and indications are better with every additional foot of depth.

In crosscutting in the Huffaker copper mine, which was recently discovered just west of Helena, a new discovery of high-grade copper glance ore, carrying gold and silver, was made.

NEVADA.

In the first week in September the Chloride, Climax and Crown Point prospects at Bold mountain were bonded to A. H. Tarbet, a wealthy Salt Lake mining man. The works are valuable, but have not been run of late years on account of lack of funds.

The Tybo mines are to be examined within the next two weeks by an expert sent by Boston capitalists who are interested in them. Upon the report of the expert rests the future disposition of the mines.

The Cosmopolitan mine in Silver City will probably resume ore production soon, as there is a marked improvement in the materials being passed through in extending the workings from the main tunnel.

OREGON.

A new mine is being opened up at Cow Creek. This mine is owned by a San Francisco company, and promises to be one of the best paying in the district.

H. Saville Sherard, who has been operating in the Eastern Oregon gold fields very successfully for the past several months, is now in control of the Golden Gate group of mines, including the Golden Gate, Blue Bucket and Whale claims, situated in the Bonanza mining district, at the head of Quartz Gulch.

English & Son of Baker City, who have for over a year been developing the Post-Lambert ledges in Mt. Baker district, are reported to have released their option to purchase the property at $250,000.

What is believed to be one of the largest gold strikes in the Baisley-Elkhorn district was made a few days ago. It was made on the Baisley-Elkhorn and Pocahontas Belle mines.

The copper property near Waldo is being extensively developed and regular shipments are being made.

PENNSYLVANIA.

The Pittsburg railroads are preparing to take care of a vast increase in the local shipments of coal. In order to do this there will have to be at least thirty additional train crews and no less than 1,000 new cars and fifty new locomotives.

The Pittsburg & Buffalo Coal Co.'s plant at Canonsburg will soon be ready to operate. James Jones & Sons, formerly connected with the River mines, and the principal operators in the Monongahela valley, have purchased 1,100 acres of coal land near Canonsburg. When equipped these will be among the finest mines in this country. They will give employment to 600 miners and 100 day workmen.

The Pittsburg & Baltimore Coal Co. has contracted with the Westmoreland Coal Co. for 75,000 tons of coal to be shipped to England. The order will be filled from mines in Irwin district.

An English syndicate is said to be dealing for 25,000 acres of coal land in Upper and Lower Burrell, Bell, Allegheny and Washington townships. It will take some $4,000,000 to close the deal.

UTAH.

The properties of the Grand Gulch Mining Co. are to be provided with a smelter. At the present the company has to team its ores over 100 miles to transportation.

The managers of the Dixie, near St. George, are again turning out copper and delivering it to the railway at Modena, from whence it is shipped. The hoisting plant, which is to be worked by gasoline, will soon be in operation when sinking of the shaft will be continued.

After four years' constant operation, carried on by a number of Park City men, the Alice mine closed down the first of September. What the future of this property will be is uncertain, but for a time, at least, it will remain idle.

The Star Consolidated Co. of Tintic has recently marketed three carloads of gold-bearing ore, which derived about $3,500. They will follow this up with more sales.

The Centennial-Eureka of Tintic came forward recently with a lot of copper ore for the handling of which twelve cars were needed. This section was formerly noted for silver and gold with now and then a little lead.

The last of the material for the roasting plant at the Sacramento of Mercur is on the ground, and will be placed in position as soon as possible. With the roaster in operation the management will begin active stoping upon high-grade sulphides, some of which have shown $170 a ton in gold.

WASHINGTON.

Maj. J. Edward Leckie and a few others have purchased a valuable claim on Trout Creek.

A few days ago the proprietors of the Zella M. mining claim, situated at Sheridan Camp, about twelve miles south of Chesaw, sent a carload of ore to the smelter for sample. This week they received the returns which netted $18,000 for the carload.

Rich ore has been uncovered in the Mother lode mine, near Palouse. In crosscutting a ledge more than a ton of ore worth about $6,000 was taken out. Taylor Bros. of Farmington are the owners of this mine.

The Bishop claim on Jerome Creek, about twenty miles from Palouse, will begin to ship soon.

On the Tom Thumb at Republic only one machine drill is used at present. Operations are confined to extending the cross-cut from east to west to connect both ledges running through the property.

Porphyritic quartz carrying free gold has been found in the cross-cut of the east drift of Flag Hill mine.

The report comes from Nelson that a big strike in copper has been made on the Copper Bullion.

The city of Seattle has arrived at Seattle from Skaguay with $700,000 in Klondike gold, consigned to the Seattle Assay Office.

The American Mining & Investment Co. of Spokane is preparing to run a long tramway from the Curlew district to Grand Forks.

After a shutdown of nearly seven months, the Centre Star has resumed shipments, the first installment consisting of 360 tons.

The Hawkeye claim on Lambert Creek has sprung into prominence of late. It was opened up last spring, and then closed again. Two dwelling houses have been built and more will be soon. It is the intention to run the mine all winter.

The stockholders of the Bodie Mining Co. are well satisfied with their properties. The ledge which has been struck is ten feet wide and some of the assays of a streak along the foot wall for a width of from twenty to twenty-four inches, go as high as $680 to the ton.

A ledge has been located on the Manila mine. The full value of the find has not yet been determined, but it is supposed to be of considerable richness. The location of the ledge will determine the value of the section.

The compressor house at the Knob Hill mine has been completed for some time, and last week the 80-HP. boilers were bricked in and now await the arrival of a ten-drill compressor.

WEST VIRGINIA.

The increased demand for coal around the section of Bluefield has caused a new coal shipping company to be formed. The company will be incorporated under the name of Bluefield Coal & Coke Co., and will act as producers' agents for the sale of coal and coke.

BRITISH COLUMBIA.

The furnaces of the Granby smelter at Grand Forks were blown in early in September, and the sampling works have commenced operations.

The first shipment of ores from the Le Roi No. 2 mines was made to the Northport smelter the first week of September. Preparations are being made for regular shipments.

News has come to Victoria from Dawson of a robbery of $300 in dust from Bradley & Dunham, owners of the Hillside claim. The robbery was evidently carried on by somebody familiar with the workings of the mine, for it was committed at night during a fifteen-minute interval which is taken for lunch.

Arrangements are being made for a winter freight service from Victoria to Dawson.

News has been brought from the Black Diamond at Lardeau that they are running a tunnel along the hanging wall on the lead. They are encountering a galena ore carrying small gold and copper values.

The Canadian Gold Fields syndicate of Rossland has acquired the Commonwealth group of claims near Crawford Bay, the consideration being $50,000. The property is well developed, and work is to be continued.

The Centre Star mine at Rossland has made its initial shipment of twelve carloads of ore to the smelter at Trail. The total shipment was about 360 tons.

CANADA.

It is expected that arrangements will soon be completed for the consolidation of the Inverness and Richmond Railway Co. with the Broadcave Coal Co. The object is to form a powerful consolidation that will be an influential factor in developing the export of coal from Nova Scotia.

The Calabogie Mining Co., in eastern Ontario, has received an order to supply 10,000 tons of iron ore to the Midland smelter. The ore will be shipped by the Kingston & Pembroke Railway, and the Grand Trunk.

The concern which is to build the smelter at Kingston is incorporated. It is called the Cataraqui Mining & Development Co. Senator Maclaren, James M. P. Maclaren, Senator McMillan, Charles L. Meyer and Edwin S. Leetham are the incorporators.

IRON AND STEEL

PITTSBURG DEAL: The Republic Iron & Steel Co. and the American Steel & Iron Co. have completed an arrangement by which the latter is to withdraw from the merchant bar trade, while the former discontinues its sheet production.

PREPARING FOR EXPORT TRADE: From one point of view a piece of work recently taken by the Pennsylvania Steel Co. is of notable interest. It is for the erection of the steel coal pier which the Norfolk & Western Co. is about to provide at Hampton Roads specially for the coal export trade, thus showing that that business is regarded as certain enough to justify outlay for special facilities.

CLEVELAND'S LARGE ORDERS: All the steel plate mills in the Cleveland section have taken orders which will tax their full capacity for the remainder of this year, and not another ton can be sold for delivery before January 1. The cause of this is that during the recent decline in the steel market orders were placed for the construction of nineteen new steel lake steamers, and the builders, taking advantage of the low price of steel, placed their orders for plates and these orders were sufficient to take up the entire capacity of the mills for the balance of the year.

AS TO THE TRANS-SIBERIAN RAILS: President Felton of the Pennsylvania Steel Co. declares that the reported failure of the Trans-Siberian Railroad is due to poor engineering and not to the rails furnished by his company. He says that whatever break-downs may have occurred during the recent rush in the transportation of troops and army supplies were due to faulty construction of road beds and not to the character of the rails supplied by his company.

The work was in the hands of natives whose education in engineering matters has been sadly neglected.

THE OUTLOOK ABROAD: Vice-president Bowron of the Tennessee Coal & Iron Co., who has recently returned from a five months' trip to Europe where he went to promote the export trade from this district, says the demand for American iron and steel in Europe is as strong as ever and the export business from the South is sure to develop year by year. Exports are hampered now by excessive railroad rates to the coast and by the abnormal ocean freight rates. He believes these drawbacks will eventually be overcome. He favors the proposed canal from Bessemer to the Warrier river, which will render this district more independent of the railroads.

GRATIFYING FOREIGN ORDERS: The Baldwin Locomotive Works of Philadelphia has taken orders for twenty-two heavy freight locomotives for use on the New Zealand government railroads. It has also taken an order for six locomotives for the Rio Tinto Mining Co. of Spain. This is a British corporation which is engaged in mining ore. During the past two weeks the firm has shipped to Belgium six locomotives for the Belgian State Railway. Six more are ready to be shipped. The first American-made locomotives to be used in Ireland were shipped about two weeks ago. They are the two engines of the English type which are intended for use on the Border & South Coast Railway.

BRITISH IRON AND STEEL MARKET: In spite of the rise in coal and pig iron, says the London Statist, "the Scotch malleable iron makers have within a few weeks reduced bars by twenty shillings, being compelled to do so by American competition. Yet they obtained little or no business by the reduction. In the steel trade consumers' orders are withheld because they say they can buy, or expect to buy, cheaper from American and German makers. Steel plates were brought from America to Glasgow for transshipment there to the East at a lower cost, including freight and charges, than the price of the local makers. Tubemakers import American strips very much cheaper than they can buy them at home. And so on all through the steel trade. Hardly a steamer coming from America but has some iron or steel on board."

Another point observable in this connection is the invasion of Great Britain by American steel plates for the sheathing of ships.

CARNEGIE CHANGES: It seems that the recent denial of Carnegie's officials of the story that extensive changes in the personnel of the staff were about to take place was given out for business reasons or some other consideration. It is announced that at a meeting of the Board of Directors held on September 18, the following changes were made: The resignation of A. M. Moreland as secretary and director of the Carnegie Steel Co. was accepted, and W. W. Blackburn was appointed to succeed him in both positions. W. C. McCausland, cashier for Carnegie, Phipps Co. and the Carnegie Steel Co., Ltd., succeeds Mr. Blackburn as assistant treasurer of the Carnegie Steel Co. Frank A. McCune was appointed as cashier to fill the vacancy caused by Mr. McCausland's promotion. The resignation of George Megrew as a purchasing agent of the Carnegie Steel Co. was accepted, but his successor was not appointed. C. E. Locke has succeeded George H. Wightman as sales agent of the Carnegie Steel Co. at Boston. It is stated that aside from the above no further important changes among officials of the Carnegie interests are contemplated at this time.

COAL AND COKE

SEVEN MONTHS OF EXPORTS: Reports to Bradstreet's show that exports of coal from the United States for the first seven months of 1900 were 4,601,755 tons, valued at $12,137,161, an increase over the first seven months of 1899 of 1,595,673 tons, and an increase in value of $4,263,872. British North America and Mexico were the largest outside purchasers of our coal, only 278,572 tons having so far this year been shipped to Europe, though it is probable that forthcoming statistics will show better results, especially as strikes among colliery workers are quite common in England.

CHINA'S ANTHRACITE: Before the Boxers began their dreadful work in China it was expected that what is known as the Peking Syndicate, a group of European capitalists, would soon greatly enlarge the output of the mines near Tse-Chou, in the province of Shansi, about 300 miles southwest of Tien-Tsin and 500 miles from Shanghai. Noah Fields Drake, who read an account of these deposits at a meeting of the American Institute of Mining Engineers, believes that the average thickness of the main workable coal bed at Tse-Chou is about twenty-three feet; at one time a thickness of thirty-six feet was disclosed, and at two others there was a depth of from seventeen to twenty-three feet. All the coal in this field is anthracite, uniformly low in sulphur and comparatively low in ash. It is said to be wonderfully bright and glossy, and so free from dust that it can often be handled without soiling the hands. In a district of 150 square miles Mr. Drake thinks there are 3,000,000,000 metric tons of this coal. But, Mr. Drake says, this "is only a little of the ragged edge of the great coal fields of the province of Shansi," in which Baron von Richtofen, who made an examination in 1870, believed there were 630,000,000,000 tons of anthracite alone. The Chinese, mining in a primitive way, hoisting by man-power windlass, and distributing the product in ox-carts or by pack animals, have been taking from the Tse-Chou mines about 50,000 tons a year.

The Coalfields of Nova Scotia.

CAPE BRETON.

The coalfields of Cape Breton comprise four large areas—(1) on the coast east and west of Sydney Harbor; (2) in Inverness county, between Margaree Harbor and Port Hood, including important mines at Broad Cove; (3) a basin on River Inhabitants, near Glendale; and (4) a tract in Richmond county, near the mouth of River Inhabitants. But as all the mines at present worked, producing about 2,000,000 tons of coal annually, lie within the Sydney coalfield, this alone will be referred to.

The land area occupied by coal-bearing rocks in the Sydney coalfield has been estimated at 200 square miles, while an immense submarine area contains large seams of coal in workable condition, easily accessible. The rocks are regular and rest everywhere on the millstone grit, except where brought by a fault against a mountain of Laurentian rocks at New Campbellton at the western edge of the coalfield.

The coal measures have been folded into subordinate basins so as to bring the coal seams to the surface under the most favorable conditions for their extraction and shipment. The whole coast is deeply indented by bays and channels approximately coinciding with the axes of these folds, affording to the sea cliffs numerous natural exposures of the coal seams and accompanying strata and constituting excellent harbors, one of which, Sydney Harbor, situate toward the center of the district, is one of the finest in the world. During the few months of winter, when the more northerly harbors are closed or obstructed by ice, a railway carries coal from the collieries east of Sydney Harbor to the fine winter port of Louisburg.

The cliffs are generally from thirty to 100 feet high, and the country is of a gently rolling character, the highest altitudes seldom exceeding 250 feet. Such natural advantages, combined with its highly favorable geographical position, point to this district as probably the most important in the Dominion for the supply of fuel to the numerous steamers navigating the Atlantic.

Taking the average of all sections, the total number of seams in the productive measures is twenty-four, of which six are three feet or upward in thickness, and the total average thickness of coal may be stated at forty-six feet. The similarity and persistency of the seams over great areas is very remarkable, although local variations are frequent. There is, therefore, no great uncertainty in regard to the equivalency of the various seams at different points. They generally dip at a very low angle and are little affected by faults and disturbances.

The coal is of the soft, or bituminous variety, with comparatively little diversity in the quality of the different seams, all of which yield a coal exceedingly well adapted for steam and domestic purposes, while that of some of them is especially applicable to the manufacture of gas. Much of it will compare very favorably with the best English coal. As compared with the Pictou coal it is characterized by a greater proportion of combustible matter and a smaller proportion of ash; but on the other hand it usually contains a greater amount of sulphur; although experiments made on a small scale at Ferrona seem to prove that some of the coals will yield a coke as suitable for iron smelting as that made from a mixture of Acadia, Drummond and Springhill coals.

Underclays, charged with roots and innumerable rootlets, occur beneath every coal seam and bed of carbonaceous shale, and their roof shales are for the most part rich in fossil plants. The productive measures contain also beds of argillaceous and arenaceous shale, usually grey; sandstone, limestone, red and green marl. They are underlaid in descending order by the millstone grit, carboniferous limestone and conglomerate.

THE CUMBERLAND COALFIELD.

This is the most westerly of the coal districts of the province, and lies, for the most part, adjacent to Chignecto Bay, the more northerly and westerly of the two arms into which the upper part of the Bay of Fundy is divided.

The coal measures outcrop on the shores of Cumberland basin, run eastward into the land for about eighteen miles, and outcrop again before they enter upon the return outcrop, running westward to the seashore. The northern outcrop has been systematically worked on the shore at the Joggins mines with a present annual output of about 80,000 tons on a seam yielding about six feet of coal. The remainder of this side of the basin has not yet received much attention, but will, as the demand for coal increases, become more fully worked. The principal operations in this district are at the apex of the basin; as at Springhill, where the Cumberland Railway & Coal Co. is engaged in mining three valuable seams. The seams dipping at angles of from ten to thirty-five degrees are entered by slopes to a depth of 4,000 feet, and worked by shoots and "balances," and, in the case of thinner parts of the seams, by longwall. The extraction of pillars has been carried on systematically and with unusual success. As a certain amount of gas is evolved in these mines, no explosive is used in getting the coal. The ventilation is provided for by blow-down fans with numerous outlets.

The general composition of the coals of this district is about as follows:

	Per cent.
Moisture	1.46
Volatile combustible matter	33.69
Fixed carbon	59.35
Ash	5.50

They are very extensively used as a locomotive fuel and for coke and domestic purposes.*

THE METAL MARKETS.

General Review and Forecast of Trade Conditions

Silver Steady—Copper Firm—Complete Collapse of Tin—Lead Unchanged, Spelter Quiet—Iron and Steel Adjusting Themselves to Present Conditions—Coal Hinging on Strike Prospects—Coke Improving.

Silver has shown less strength of late and has even moderately receded at times. A firm tone characterizes the market, however, and the demand continues good. Continental speculators still favor the bull side and they have bought largely for export delivery.

Our latest quotation for commercial bars at New York was 62⅝ per ounce, and for Mexican dollars 49⅜.

COPPER STILL UNYIELDING.

Consumers of copper seem to have accepted high prices as a fairly permanent feature of the copper situation, and they do not grumble now nearly so much as formerly over the 17c. standard of quotations. "The only argument available against the east wind," said Lowell, "is to put on your old coat;" and in the same way the only resource of copper buyers under existing conditions is to curtail consumption—or to purchase mines.

Exports of copper for the first eight months of the year amounted to 116,000 tons as compared with 75,000 last year. Copper production in the same period increased from 227,000 long tons last year to 238,000 in 1900. This increase is hardly proportionate to the expanding needs of consumers throughout the civilized world. In August the production of the United States actually fell off 1,500 tons from the figures of last year.

Our current quotation for Lake copper is 16¾@ 17c., with Electrolytic an eighth lower.

MINOR METALS.

Tin has often startled observers by its meteoric flights of price, but it quite outdid itself last week in a precipitous decline to 27¾. Only two months ago it was deemed by some buyers a fair purchase at 34c. The collapse here is explained by the vio-

*Extract from Transactions Am. Inst. M. E. In another paper the Pictou Coal Field will be described.

(Continued on page 15.)

MINING STOCK QUOTATIONS IN VARIOUS MARKETS

Mining stocks multiply incessantly, and we cannot undertake to record them all. We keep, however, complete records of all mining stocks, wherever listed, and we shall be glad to furnish any subscriber, on request, with detailed information about quotations. The prices given below are in most cases those current at the close of business on the day we go to press—two days before the date of issue.—*Mining and Metallurgical Journal.*

BOSTON.

Adventure	3 50	Old Colony Cop	2 50
Allouez	1 50	Old Dominion	16 00
Anaconda	41 00	Osceola	64 50
Arcadian	16 50	Parrott	39 75
Arnold	3 75	Quincy	1 42
Atlantic	22 50	Rhode Island	2 50
Baltic	20 50	Sante Fe	4 25
Bingham	11 00	Santa Ysabel	—
Bonanza	—	Tamarack	229 50
Boston & Mont.	305 50	Tecumseh	—
Butte & Boston	55 00	Tri-Mountain	8 25
Cal'met & Hecla	735 00	Victoria	2 00
Centennial	13 50	United States	9 50
Cochiti	8 50	Utah Con	28 00
Copper Range	2 00	Washington	75
Dominion Coal	38 50	White Knob	10 00
Franklin	13 50	Winona	2 50
Isle Royal	28 00	Wolverine	39 50
Merced	—	Wyandotte	39 50
Mohawk	16 00	Zinc	9 00

NEW YORK.

Adams Con	20	Golden Fleece	22
Alamo	12½	Gould & Curry	32
Alice	45	Hale & Norcr'ss	21
Amalgama'd	88 75	Horn Silver	1 25
Anaconda C	44 25	Iron Silver	58
Anaconda G	48	Isabella	1 11
Argentum	25¾	Jack Pot	—
Best & Belcher	20	Julia Consol	—
Breece	—	King & Pemb	—
Brit. Col	11 00	La Crosse	14
Brunswick	23	Leadville	04
Caledonia	40	Little Chief	17
Catalpa	08	Mexican	25
Chollar	19	Mollie Gibson	—
Chrysolite	03	Moulton	30
Com. T. stock	03	Mount Rosa	53
Com. T. bonds	03	Occidental	06
Com. T. script	05	Ontario	6 25
Con. Cal. & Va.	1 25	Ophir	48
Cr. & Cr. Creek	—	Pharmacist	11½
Crescent	08	Phoenix	08
Cripple C'k Con	—	Pinnacle	17
Crœsus	—	Plymouth	12
Crown Point	—	Portland	—
Damon	16¾	Potosi	18
Deadwood Ter	60	Quicksilver	2 00
Elkton	—	Quicksilver pr.	7 50
Eureka Con	15	Savage	10
Fath De Smet	36	Sierra Nevada	35
Findlay	13¾	Small Hopes	65
Garfield	05	Specimen	—
Standard	3 75	Utah	—
Tornado	—	Victor	—
Union	12	Work	—
Union Con	18	Yellow Jacket	20

NEW YORK INDUSTRIAL STOCKS.

Amer. Smelt.	35 50	Nat. Lead pf.	—
Am. Smelt. pf.	87 50	Press Steel Car	35 00
Am. S. & W.	20 50	Pr'ss St'l Car pf	—
Am. S. & W. pf	70 50	Republic I.	10 50
Col. F. & I.	20 50	Republic I. pf.	51 00
Fed. Steel	30 75	Stand. Oil	—
Fed. Steel pf.	63 00	Tenn. C. & I.	53 50
Nat. Lead	17 00		

TORONTO.

Athabaska	6 15	No. Belle	—
Big Three	02	Olive	16
B. C. G. F'ds	03	Republic	74
Crow's Nest	38 25	Van Anda	01¾
Dardanelles	02	Virtue	09
Deer Trail No. 2	03¾	War Eagle	1 51
Fairview	02¾	Waterloo	02¾
Golden Star	06	White Bear	02
Knob Hill	46	Winnipeg	07
Minnehaha	—		

COLORADO SPRINGS.

Acacia	39½	Independence	35
Alamo	12	Ingham	14
Anaconda	39	Isabella	85¾
Anchoria	80	Jack Pot	45
Argentum	26	Keystone	12½
Bankers	13½	Lexington	13
Battle Mount.	21	Mary Cashen	12¾
Blue Bell	11½	Matoa	19½
C. C. Con	10½	Moon-Anchor	36½
C., C. & M	09½	Mount Rosa	57
Columbine	12½	National	07¾
Damon	16½	Nugget	22
Dante	09	Ophir	37
Elkton	1 08¾	Orphan	17¾
El Paso	40	Pharmacist	11½
Findley	13¾	Pinnacle	17
Garfield	05	Raven	—
Gibson	24½	Rawlings	24½
Gold Coin	6 00	Specimen	—
Golden Fleece	22	Temonj	—
Gold King	1 27	Tornado	—
Gold Knob	10½	Union	12
Gold Sover'gn	07	Vindicator	1 40
Gould	36½	Work	20¾
Hart	16½	Zenobia	12½

SALT LAKE.

Anchor	75	Joe Bowers Ex	00½
Ajax	46	Low. Mam'oth	40
Alice	40	Little Pittab'h.	00½
Bullion Beck	3 80	Mammoth	2 20
Cent. Eureka	18 00	Mercur	7 75
Chloride Point	05	May Day	43
Daly	2 15	North. Light	03¾
Daly West	18 20	Omaha	50
Dalton & Lark.	05	Ontario	5 50
Dalton	03¾	Petro	23
Dexter	81	Rich. Anac'nda	03
Daisy	00½	Sunshine	07
Eagle	01	Swansea	4 01
Eagle & Blue B'l	72	So. Swansea	1 25
Emerald	05	Sunbeam	25
Four Aces	02	Sacramento	32
Geyser-Marion	01½	Silver King	55 00
Galena	10	Star Consol	52½
Grand Central	5 00	Shower Con	12
Golden Eagle	01½	Tetro	04
Horn Silver	1 10	Utah	80
Homestake	—	Yaleo	20
Ingot	05	W. M't'n Placer	90¾
Joe Bowers	01¾	Yankee Con	18¾

SPOKANE.

Ben Hur	—	Morning Glory	07¾
Black Tail	11¾	Mountain Lion	68
Butte & Boston	02	Pearl	—
Deer Trail No. 2	04	Princess Ma'de	02
Golden Harv'st	00¾	Quilp	19
Insurgent	—	Republic	80
Jim Blaine	10	Tom Thumb	19
L. Pine Sur. Con	09		

SAN FRANCISCO.

Alpha Con	03	Kentucky Con.	04
Alta	02	Lady Wash Con	03
Andes	07	Mexican	29
Belcher	19	Occidental	06
Best & Belcher	27	Ophir	50
Bullion	02	Overman	10
Caledonia	40	Potosi	18
Challenge	19	Sag Belcher	02
Chollar	19	Savage	16
Confidence	75	Sierra Nevada	31
Con. Cal. & Va.	1 10	Standard	4 10
Con. Imperial	01	St. Louis	12
Crown Point	10	Syndicate	07
Gould & Curry	32	Union Con	18
Hale & Norcr'ss	21	Utah Con	04
Julia	04	Yellow Jacket	20
Justice	06		

MEXICO.

Name of Company.	State.	Price.
Amistad y Concordia	Hidalgo	$ 20
Angustias	Guanajuato	110
Arevalo y Anexas	Hidalgo	200
Asturiana y Anexas	Zacatecas	90
Barradon y Cabras	Durango	30
Bartolome de Medina	Hidalgo	70
Cabezon y An	Zacatecas	10
Candelaria de Pinos	"	265
Capuzaya	Durango	12
Carmen	Hidalgo	200
Cinco Senores y An	Guanajuato	200
Concepcion y Anexas	S. Luis Potosi	260
Coronas	Mexico	175
El Oro	Guanajuato	—
El Oro pref	Guanajuato	—
Esparanza y An	Mexico	1,100
Gloria	Chihuahua	—
Guadalupe	Guanajuato	200
Luz de Borda avaido	Michoacan	14
Luz de Maravillas	Hidalgo	100
Pabellon	"	20
Palma de Somb	Zacatecas	30
Pinoles	Durango	—
Rafael y Annexes	Hidalgo	—
Real del Monte	Hidalgo	550
Restauradora	Durango	20
Rosario y Annexas	Durango	—
San Francisco	Hidalgo	100
San Rafael (free)	Hidalgo	405
San Rafael (assessable)	Hidalgo	800
Ste. Maria de la Paz	S. Luis Potosi	810
Soledad	Hidalgo	230
Sorpresa	"	270
Trinidad Aviador	Guanajuato	—
Trinidad Aviado	Guanajuato	7
Tlauzingo	Puebla	—
Union Hacieda	Hidalgo	230
Zona Min. de Paz	Guanajuato	8

NOTE—Mexican stocks are figured on the basis of Mexican silver.

(Continued from page 14.)

lent fall in London and that in turn is accounted for by heavy shipments from the Straits and the certainty that these will reach a market already over supplied. Many people prefer another and simpler explanation—namely, that the tin trust has been smashed.

Trading in lead presents no special feature. The demand abroad is good, while domestic buyers seem satisfied with going prices. 4⅜c. is the current New York quotation.

Spelter also suggests no comment. Stocks are moving rather more freely than of late, and foreign dealers show some interest in the American product, but quotations remain where they have been for some time—a little above 4c. New York, a little below, St. Louis.

IRON AND STEEL.

On September 21 the steel rail manufacturers agreed upon a price of $26 per ton for their product. The new quotation will seem too large to railroad presidents and is certainly not warranted by reasoning based on cost of production. Elsewhere in this number we discuss the matter at some length, and we refer to it here chiefly for its importance in stimulating general activity in the iron and steel industry. Immense orders for rails have undoubtedly been held up pending this decision as to price, and they will be given out in likelihood now or soon. The effect upon the general industry cannot fail to be markedly beneficial.

Another event similarly wholesome and encouraging in its influence upon the iron situation as a whole is the settlement of the yearly scale reached on September 23 by the Conference Committee of the Amalgamated Association of Iron and Steel Workers and manufacturers. Work began at once for 60,000 men, who have been idle since June 30.

Aside from the reduction in price of steel rails, no marked changes of iron and steel quotations have recently been made. Buyers are still cautious as to large commitments, but they do not hesitate to place considerable orders at current prices. The general expectation is that bottom has been reached in all departments of the industry.

COAL AND COKE.

The strike of anthracite miners has, of course, unsettled all quotations. Consumers are taxed heavily by local dealers, who make the strike a cause for exacting scarcity prices. The wholesale price has advanced only from $4 to $4.65, but the quotation means little since it is certain that no great quantity could be obtained at that price under existing conditions.

The bituminous branch of the industry is enjoying more than its share of prosperous activity. The only limit, indeed, to its extension is the lack of transportation facilities. The domestic demand was brisk before the anthracite troubles. The price varies with the urgency of the buyer, but about $2.75 f. o. b. New York Harbor may be regarded as the current quotation.

For the first time in months we are able to report some improvement in the coke situation. This was to be expected from the better aspect of the iron outlook and the increase in the business of iron metals. The coal strike also contributes to the improvement since coke can be substituted in many places for hard coal. $2 and $2.25 are the prevailing prices.

NEW INCORPORATIONS

COLORADO.

CAMERON MOUNTAIN MINING & LEASING CO., Canon City; $15,000; J. G. Johnson.

VENTURE CORPORATION, London, England; mining operations in Western Australia and elsewhere; $3,750,000; A. W. Boon.

THOMAS & HENSHAW CO., Denver; $10,000; J. J. Thomas.

GOLD KING CONSOLIDATED MINES CO., Waterville, Me.; $6,000,000; M. Gallert.

ARDMORE MINING & MILLING CO., New York City; $1,000,000; F. C. Kaye.

BEAR MOUNTAIN MINING & DEVELOPING CO., Silverton; $80,000; F. Deputy.

NORTHWESTERN OIL & COAL CO., Hahn's Peak; $1,000,000; W. W. Shemmell.

HUMMER MINING CO., Leadville; $60,000; L. J. Hobart.

SPECIE PAYMENT GOLD MINING CO., Georgetown; $625,000; E. W. Williams.

NATIONAL TUNNEL MINING & MILLING CO., Denver; $500,000; F. W. Stevens.

SNOWSHOE GOLD MINING CO., Pueblo; $500,000; A. J. Monahan.

LEADVILLE MINING STOCK ASSOCIATION, Leadville; deal in stocks and mining properties; C. H. Saunders.

EMANCIPATION MINING CO., Denver; $1,000,000; C. H. Palmer, Boston, Mass.

DENVER FILMORE OIL CO., Los Angeles; $10,0000; E. B. Coe.

CORNELL MINING & MILLING CO., Dover; $50,000; H. V. Cornell.

CRIPPLE CREEK COAL & TRANSPORTATION CO., Cripple Creek; mining and shipping coal; $250,000; L. A. Bassett.

DOWN TOWN MINING CO., Leadville; $1,000,000; J. A. Ewing.

ILLINOIS.

BIRD IRON CO., Chicago; $50,000; R. R. Bradley.

GRAND COTE COAL MINING & DEVELOPMENT CO., Chicago; $150,000; N. W. Bliss.

OZARK RANGE ZINC CO., Chicago; $100,000; J. O. Curry.

IOWA.

UNIQUE IRON CO., Cedar Rapids; $10,000; F. A. Stuart.

MAINE.

ROYAL MINING CO., Berwick; $500,000; W. F. Beverly, New Bedford, Mass.

MINNESOTA.

CHISHOLM IRON CO., Duluth; $300,000; M. L. FAY, Virginia.

MISSOURI.

EUREKA EXPLORATION CO., St. Louis; prospecting for gold, silver, etc.; $10,000; E. S. Barreiras.

DAUGHERTY MINING CO., Pierce City; mining and merchandising; $10,000; G. W. Thompson.

BELEW MINING CO., St. Louis; $15,000; G. C. McDonald.

DOCTOR MINING CO., Joplin; $150,000; D. C. Doane.

CLEAR JACK MINING CO., Kansas City; $100,000; W. B. Young.

NEW YORK.

HENDERSON & KLONDIKE MINING SYNDICATE, Adams; $50,000; W. S. Rice.

JAMES H. DAVIDSON CO., New York City; $10,000; J. H. Davidson.

NEW JERSEY.

LA CEIBA COPPER MINING CO., Jersey City; $1,000,000; N. J. Easton.

JANSON STEEL & IRON CO., Oxford; mining and manufacture iron and steed; $100,000; F. Janson.

PENN OIL, GAS & MINING CO., Camden; $500,000; A. Steelsmith.

OHIO.

ROYAL COAL CO., Cleveland; $100,000; C. Higley.

BELMONT COAL CO., Flushing; $6,000; J. Stambaugh.

(Continued on page 16.)

(Continued from page 15.)

PENNSYLVANIA.

MONTEREY COAL CO., Pittsburg; $1,000; A. E. McKee.

LIBERTY COAL CO., Pittsburg; $7,000; W. B. Verner.

STUART COAL MINING CO., Hooversville; $100,000; W. R. Davis.

HENDERSON COAL CO., Pittsburg; $20,000; W. M. Henderson, McKeesport.

GREENWICH COAL & COKE CO., Latrobe; $200,000; J. W. McFadyen.

WASHINGTON.

CHICO GOLD MINING & MILLING CO., Tacoma; $375,000; W. H. Remington.

RAMORE MINING CO., Republic; $1,000,000; A. C. MacCallum, Anaconda, Mont.

INCA MINING & MILLING CO., Colfax; $1,000,000; M. O. Reed.

PIERRE LAKE GOLD MINING CO., Northport; $150,000; H. W. Working.

PIERCE GOLD MINING CO., New Whatcome; $10,000; J. Murry.

COLUMBIA MINING CO., Seattle; $1,000,000; C. V. Ross.

MEXICO MINING & MILLING CO., Spokane; $100,000; J. W. Ferguson.

AMERICAN BOY MINING & MILLING CO., Spokane; $150,000; S. Haas.

GOLD STAR MINING CO., Seattle; $1,000,000; J. E. McManus.

GLADSTONE GOLD MINING CO., Tacoma; $500,000; T. W. Loomis.

COPPER QUEEN MINING CO., Spokane; $25,000; D. W. Henley.

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ROY HOPPING,
129 4th Ave., N. Y.

CAPITALIST or Promoter required to form company to purchase and operate fifty miles of gold dredging territory (not Yukon). Estimated value per cubic yd., 30 to 60 cents; estimated cost per cubic yd., 3 to 5 cents; estimated amount of auriferous gravel, 70,000,000 cubic yds. Address, "N. W. T.," New York Office, M. and M. Journal.

CHEMIST desires position in commercial laboratory or technical works. Best of references as to professional and business ability. J. W. FELL, Asheville, N. C.

PARTNER required in active management very extensive gold dredging interests. Price of share, $20,000. References exchanged. Placer engineer preferred. Address, CANADA, New York Office, M. and M. Journal.

EXPERT hydraulic and steam engineer, experienced in transmission of power by electricity, desires position (Colorado or Montana preferred) as superintendent of mining power plant. Address,
E. S. C., Mining and Metallurgical Journal.

WANTED.—Position as superintendent by pushing and up-to-date mining engineer, who understands all branches of mining and milling gold ores. Has his own assay outfit, and would be willing in a small mine to do the assaying and surveying. Address,
D. P. A., Mining and Metallurgical Journal Office.

GEORGIA GOLD MINING.—Party long experienced in mining and milling desires co-operation for handling choice exploited property secured by lease-option. Very small amount needed. Correspondence solicited. MINER, 24 Ellis St., Atlanta, Ga.

AN EXPERIENCED assayer and bullion refiner with the best of references, several years' experience, and a university training, desires employment with some mining company. HAROLD FRENCH, Los Angeles Office, M. & M. Journal.

WANTED: PARTNER or Co. to open coal mine near RANDSBURG. Three veins, the third being nine feet, four feet solid coal, 101 feet from surface. Two first viens opened with shaft. 1,600 acres discovered along the rim of field.
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A MINING engineer, with camping and assay outfit, would be glad to join a prospecting party on reasonable terms. Address, PROSPECT, Mining and Metallurgical Journal Office.

SITUATION WANTED.—A competent and experienced mill man desires position on concentrators or batter frame. Highest references. Address, L. W., 509 Kearny St., Room 2, first floor, San Francisco, Cal.

ENGINEER and Metallurgist of long experience, fearless, energetic, trustworthy, seeks position; managing, erecting, reporting or developing. Speaks French, German, Spanish and excellent Chinese. Exceptional testimonials. Will go anywhere. Address, MINERO, Mining and Metallurgical Journal Office.

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COPPER claim for sale. Vein 30 feet wide, averages 15 per cent copper and $12 gold per ton. Will sell on easy terms, or bond to responsible parties. Unencumbered, and not in litigation. MRS. FRANK RYLAND, Wickenburg, Ariz.

PENNSYLVANIA COAL LAND FOR SALE.—20,000 acres within 18 miles of Pittsburg, on river and rail. Vein six to seven feet. All mine openings would be self-draining. Full description furnished. SAMUEL BORDENKIRCHER, 76 Hillsdale Ave, Cleveland, O.

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A LARGE Gold deposit. Will average $15.00 free gold suitable for Cyanide process. Twelve miles from railroad, in Arizona. Terms reasonable.
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FOR SALE.—Near Birmingham, Ala., a rich iron mine. Brown hematite ore, 26-foot vein, average 65 per cent. Also fine vein of silver and copper. For full particulars, address G. W. WRIGHT, Groesbeck, Texas.

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A PROMISING group of copper mines, located 14 miles from Tucson, Pima County, Arizona. For particulars apply to W. S. NEFF, 137 S. Fourth Ave., Tucson, Ariz.

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MINES in Tatepuzco District, For Sale, Lease or Bond.—Five old mines, forming group with 1,000 tons of ore in the dumps. Concentrating ore, averaging 30 ozs. silver and ½ oz. to the ton; lead, 30%; iron, 13%; zinc, 12%. Lands suitable for raising live stock; 40,000 acres, with water and timber rights. Reports and maps sent on application. Address, LIC ELIAS GALINDO, Tepic, Mexico, P. O. B. No. 26.

MINES FOR SALE; or will purchase and explore mines. Knowledge of mining in Mexico. CHARLES VON ERXLEBEN, Civil and Mining Engineer, U. S. Deputy Mineral Surveyor, Tucson, Ariz.

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is a corporation organized under the laws of the State of Delaware, with an authorized capital stock of $400,000; par value, $1.00 per share; non-assessable and no personal liability of shareholders. Principal office at Wilmington, Delaware, with Delaware Charter Guarantee & Trust Co., and branch executive office at Santa Ana, Orange county, California. At par value 180,000 shares of this stock are issued for mines and oil lands, equipment and supplies. The balance, 220,000 shares, is being sold at par value for cash. Subscriptions for these shares (one or many) can now be made and paid for at par, $1.00 per share, all down, or in advance installments of not less than 10% per month. The certificates are issued to subscribers when fully paid. The cash thus received will be used in the furtherance of the Company's interests and the prosecution of its business affairs. The properties will be rapidly and thoroughly developed and energetically operated so as to produce the best results for the shareholders. The production of gold, copper, lead and silver ores and oil, as well as any other businesss co-incident therewith will be vigorously handled. This is a good healthy enterprise, with excellent propositions in hand for immediate operations. Your correspondence and patronage are requested. In your remittances send Post Office Money Orders or drafts on New York City banks, payable to the United Mines Mining Co., and address all correspondence to GILES OTIS PEARCE, General Manager, Santa Ana, Orange County, California.

BUYERS' GUIDE

Our Buyers' Guide is arranged to assist those who expect to purchase machinery and supplies to find quickly and easily the addresses of the leading dealers. A postal card addressed to this paper will bring you the catalogues of all houses named under any classification.

AIR COMPRESSORS
Edw P Allis Co, Milwaukee, Wis
M C Bullock Mfg Co, Chicago, Ill
Colorado Iron Wks, Denver, Colo
W H Emanuel, Denver, Colo
Fairbanks, Morse & Co, Chicago, Ill
Gates Iron Works, Chicago, Ill
Joshua Hendy Machine Wks, S Francisco, Cal
Ingersoll-Sergeant Drill Co, N Y City
Parke & Lacy Co. S Francisco, Cal
Willis Shaw, Chicago, Ill
Sullivan Machinery Co, Chicago, Ill
Union Gas Engine Co, S Francisco, Cal
Weber Gas & Gasoline Eng Co, Kansas City, Mo
J Wigmore & Sons Co, Los Angeles, Cal

AMALGAM PLATES
Edw P Allis Co, Milwaukee, Wis
F G Denniston, S Francisco, Cal
Joshua Hendy Machine Wks, S Francisco, Cal
San Francisco Novelty & Plating Wks, S Francisco, Cal
John Taylor & Co, S Francisco, Cal

ARC DYNAMOS
W H Emanuel, Denver, Colo

ASBESTOS GOODS
G C Fowler, S Francisco, Cal

ASSAYERS AND CHEMISTS
W O Abbott, Tombstone, Ariz
Lew E Aubury, Los Angeles, Cal
Baker & Co, N Y City and Newark, N J
E E Burlingame & Co, Denver, Colo
Baily & Monnig, Denver, Colo
Wm M Courtis, Detroit, Mich
Louis Falkenau, S Francisco, Cal
Hamlin & Morrison, Philadelphia, Pa
A. A. Hanks, S Francisco, Cal
Clarence Hersey, Leadville, Colo
Ogden Assay Co, Denver, Colo
R A Perez, Los Angeles, Cal
John T Reed, San Bernardino, Cal
D W Reckhart, El Paso, Tex
Ricketts & Banks, N Y City
Selby Smelting & Lead Co, S Francisco, Cal
Ernest H. Simonds, S Francisco, Cal
Simonds & Wainwright, N Y City
State Ore Sampling Works, Denver, Colo
Wade & Wade, Los Angeles, Cal
Henry E Wood, Denver, Colo

ASSAYERS' SUPPLIES
Wm Ainsworth & Sons, Denver, Colo
Baker & Adamson Chemical C Easton, Pa
Baker & Co, N Y City and Newark, N J
F W Braun & Co, Los Angeles, Cal
Denver Fire Clay Co, Denver, Colo
Queen & Co, Philadelphia, Pa
Richards & Co., Ltd, N Y City
Roessler & Hasslacher Chemical Co, N Y City
Schoellkopf, Hartford & Maclagan, N Y City
Smith & Thompson, Denver, Colo
John Taylor & Co, S Francisco, Cal
Henry Troemner, Philadelphia, Pa
Western Chemical Co, Denver, Colo

BABBITT METAL
Joshua Hendy Machine Wks, S Francisco, Cal

BAR IRON AND STEEL
J Wigmore & Sons Co, Los Angeles, Cal

BANKERS AND BROKERS
Lytle & Co, Galena, Kan
Morgan-Watson Mining & Construction Co, Cleveland, O

BELT DRESSING
Jos Dixon Crucible Co, Jersey City, N J

BELTING
Edw P Allis Co, Milwaukee, Wis
Gutta Percha & Rubber Mfg Co, S Francisco, Cal
Goodyear Rubber Co, S Francisco, Cal
Joshua Hendy Machine Wks, S Francisco, Cal
Jeffrey Mfg Co, Columbus, O
Link-Belt Machinery Co, Chicago, Ill
Robins' Conveying Belt Co, N Y City
Shultz Belting Co, St Louis, Mo
S S Machinery Co, Denver, Colo
J Wigmore & Sons Co, Los Angeles, Cal

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I C Yawger, N Y City

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J Wigmore & Sons Co, Los Angeles, Cal

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California Anti-Caloric Co, S Francisco, Cal
Colorado Iron Works, Denver, Colo
Fairbanks, Morse & Co, Chicago, Ill
Joshua Hendy Machine Wks, S Francisco, Cal
Jas Leffel & Co, Springfield, O
Lidgerwood Mfg Co, N Y City
Chas C Moore & Co, S Francisco, Cal
Murray Iron Works, Burlington, Iowa
Ruggles-Coles Engineering Co, N Y City
S S Machinery Co, Denver, Colo
Wm B Scaife & Sons, Pittsburg, Pa
J Wigmore & Sons Co, Los Angeles, Cal

BOILER COMPOUNDS
Geo W Lord, Philadelphia, Pa

BOILER COVERING
California Anti-Caloric Co, S Francisco, Cal

BOILER TUBE CLEANERS
Coggeshall Mfg Co, N Y City

BOOKS
Mining & Metallurgical Journal, N Y City
Philadelphia Book Co, Philadelphia, Pa
D. Van Nostrand Co, N Y City

BRASS GOODS
American Injector Co, Detroit, Mich
Joshua Hendy Machine Wks, S Francisco, Cal

BUCKETS
Joshua Hendy Machine Wks, S Francisco, Cal
Jeffrey Mfg Co, Columbus, O
Link-Belt Machinery Co, Chicago, Ill
Thomson & Boyle, Los Angeles, Cal
Weber Gas & Gasoline Eng Co, Kansas City, Mo
J Wigmore & Sons Co Los Angeles, Cal

CAP CRIMPERS
Metallic Cap Mfg Co, N Y City

CARBONS
American Diamond Rock Drill Co, N Y City
M C Bullock Mfg Co, Chicago, Ill
Joshua Hendy Machine Wks, S Francisco, Cal
Theo Lexow, N Y City

(Continued on page VII.)

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BUYERS' GUIDE—Continued.

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Joshua Hendy Machine Wks,	S Francisco, Cal
Hercules Gas Engine Wks,	S Francisco, Cal

FURNACES

F W Braun & Co,	Los Angeles, Cal
Colorado Iron Wks,	Denver, Colo
Joshua Hendy Machine Wks,	S Francisco, Cal
Wm Hoskins,	Chicago, Ill
John Taylor & Co,	S Francisco, Cal

GAS ENGINES

Fairbanks, Morse & Co,	Chicago, Ill
Joshua Hendy Machine Wks,	S Francisco, Cal
Hercules Gas Engine Co,	S Francisco, Cal
Oriental Gas Engine Co,	S Francisco, Cal
S S Machinery Co	Denver, Colo
Temple Machine Co,	Denver, Colo
Union Gas Engine Co,	S Francisco, Cal
Weber Gas & Gasoline Eng Co,	Kansas City, Mo
J Wigmore & Sons Co,	Los Angeles, Cal

GASOLINE ENGINES AND HOISTS

Union Gas Engine Co,	S Francisco, Cal
Weber Gas & Gasoline Eng Co,	Kansas City, Mo

GEARING

Edw P Allis Co,	Milwaukee, Wis
Joshua Hendy Machine Wks,	S Francisco, Cal
Hercules Gas Engine Wks,	S Francisco, Cal
Jas Leffel & Co,	Springfield, O
Link-Belt Machinery Co,	Chicago, Ill
J Wigmore & Sons Co,	Los Angeles, Cal
Henshaw, Bulkley & Co,	S Francisco, Cal

GOLD WASHERS

A G Godfrey,	Los Angeles, Cal
Russell & Kinsey,	Los Angeles, Cal

(Continued on page XI.)

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Between the East and West the

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will take you in the most comfortable way. It is the only line with its own tracks between Chicago, Kansas City, San Francisco, Los Angeles and San Diego, with daily trains carrying Pullman Palace and Tourist Sleeping Cars, Reclining Chair Cars (Seats Free). Before making your trip get full particulars of any

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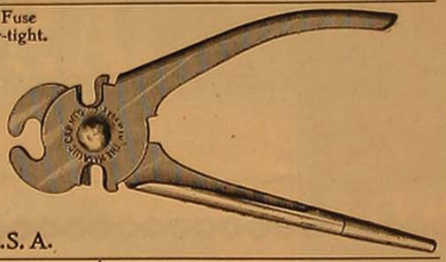

GREENVILLE, Me., Oct. 27, 1898.

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GENTLEMEN:—My foreman handed me to-day circular of your Cap Crimper. Please send me one by mail soon as possible, as my men always use their teeth. Mail bill—upon receipt will send amount of same. Have used 700 of your XXXX caps this summer and they have given perfect satisfaction. To-day some of my dynamite was frozen but had no trouble in getting good results.

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A valuable book on Water sent on application.

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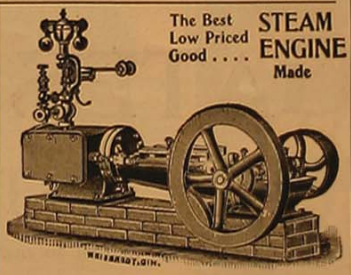

Governor and Belt, Fly Wheel, Driving Pulleys, Glass Oil Cups, Drain Cocks and Sight Feed Lubricator furnished with Engine. From four to twenty horse-power.

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Our 24-inch Wrench is the Best Tool of its kind in the World

A STRICTLY HIGH-GRADE TOOL—DROP FORGED—WARRANTED

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MADE IN THREE SIZES

	10 in.	16 in.	24 in.
Pipe	⅜ to 1 in.	¼ to 1½ in.	— to 2½ in.
List	$2.25	$3.00	$6.00

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(Continued on page XIII.)

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